



NOISE MANAGEMENT PLAN



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Document Owner

Manager Sustainability

Document Approver

Project Study Director

Revision History

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Definition of Terms

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing under typical ambient noise conditions A-weighted levels are used, as human hearing does not respond equally at all frequencies
ABL	Assessment Background Level (ABL) - the single-figure background level representing each assessment period - day and night (that is, two assessment background levels are determined for each 24 hour period of the monitoring period). Its determination is by the tenth percentile method
ACR	Annual Compliance Report
ACDT	Australian Central Daylight Time
Background noise level	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA ₉₀ descriptor
BOM	Australian Government Bureau of Meteorology
C-weighted	A spectrum adaption term that is commonly used for higher level measurements and peak sound pressure levels. The A-weighting curve is used extensively for general purpose noise measurements but the C-weighting correlates better with the human response to high noise levels
Characteristic	Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy 2007 (Noise EPP) to be fundamental to the nature and impact of the noise
Continuous noise level	A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise EPP
Day	Between 7:00am and 10:00pm as defined in the Noise EPP
dB	Decibel - a unit of measurement used to express noise (or sound) level. It is based on a logarithmic scale. Humans cannot generally perceive a 2–3 dB change in sound level, while a 6-10 dB change is generally perceived as a doubling or halving of loudness
dB(A)	Units of the A-weighted noise level
DPC	Department of the Premier and Cabinet
DSD	Department of State Development, South Australia
EML	Extractive Minerals Lease 6439
EMS	Environmental Management System
EPA	Environment Protection Authority South Australia
Extraneous noise	Noise caused by wind (such as wind on vegetation or the microphone diaphragm), insects, animals, birds, aircraft or unusual traffic conditions or any other infrequently occurring event
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second
HMCV	Hillside Mine Community Voice



Hz	Hertz
kHz	Kilo Hertz
LA ₉₀	A-weighted sound pressure level exceeded for 90% of the measurement time in decibels. The LA ₉₀ level is commonly referred to as the background noise level
LA _{eq}	The A-weighted equivalent continuous noise level - the level of noise equivalent to the energy-average of noise levels occurring over a measurement period in decibel.
LA _{max}	The A-weighted maximum instantaneous sound pressure level in decibels
ML	Mineral Lease 6438
MPL	Miscellaneous Purposes Licence 146
Night	Between 10:00pm on one day and 7:00am on the following day as defined in the Noise EPP
NMP	Noise Management Plan
Noise Logger	An instrument that measures sound pressure levels at regular intervals and stores statistical data in various noise metrics. In some cases the noise logger may also store audio to assist with noise source identification
Noise source	Premises or a place, at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
Noise EPP	South Australian EPA's Environment Protection (Noise) Policy 2007
Noise-affected premises	Residential premises that are in separate occupation, or not on the same land, as the noise source. The noise source must be audible at the premises to be considered
NTL	Noise Trigger Level
RSF	Rock Storage Facility
Sound Level Analyser	An instrument that measures sound pressure levels with advanced analysis capabilities, such as spectral analysis which splits the sound into frequency components. Sound level analysers generally have greater measurement accuracy than noise loggers
Sound power/ Sound power level	Sound power is the total sound energy emitted by a noise source, per unit of time. The unit of sound power is the watt (W). Sound power level is the logarithmic ratio of sound power to the threshold of hearing expressed in decibels
TSF	Tailings Storage Facility

1. INTRODUCTION

Rex Minerals Limited plans to develop and operate the Hillside Mine, situated 12 kilometres south of the township of Ardrossan. Conventional open cut mining techniques will be employed using trucks and excavators to deliver ore to a processing plant that will produce a copper concentrate.

This Noise Management Plan (NMP) provides a description of the measures to be implemented by the Hillside Mine to mitigate noise impacts and comply with the conditions outlined within the Mining Lease 6438 (ML) and Extractive Minerals Lease 6439 (EML) conditions and other statutory requirements.

1.1 ENVIRONMENTAL MANAGEMENT SYSTEM

Rex Minerals is committed to minimising the impact of its operations on the local environment and community, and is developing a comprehensive Environmental Management System (EMS), that will be based on the International Standard 14001:20015. This NMP is a component of the Hillside Mine EMS.

1.2 OBJECTIVES

The objective of this Plan is to provide the framework for:

- ensuring compliance with all relevant statutory requirements;
- Rex Minerals Policies and Standards;
- implementing tools and practices to manage and minimise the impact of noise from mining operations on the environment and nearby residences;
- providing details on noise management responsibilities; and
- maintaining an effective response mechanism to deal with issues and complaints.

2. NOISE CONDITIONS

The following Hillside Mine ML conditions (Second Schedule) relate to Noise.

10. Subject to Condition 11, the Tenement Holder must ensure that noise generated from mining operations on the Land:
 - 10.1. Is measured, for or at, all sensitive receivers in accordance with the Environment Protection (Noise) Policy 2007, under the Environment Protection Act 1993 of South Australia; and
 - 10.2. does not exceed the following noise limits, at those sensitive receivers:
 - 10.2.1. 56 dB(A) between the hours of 7am and 10pm and 49 dB(A) between the hours of 10pm and 7am within a Primary Production Zone (as delineated in the Yorke Peninsula Council Development Plan at the date that the Mining Tenement was granted, set out in the Seventh Schedule of this Tenement Document); or
 - 10.2.2. 54 dB(A) between the hours of 7am and 10pm and 47 dB(A) between the hours of 10pm and 7am within a Settlement Zone (as delineated in the Yorke Peninsula Council Development Plan at the date that the Mining Tenement was granted, set out in the Seventh Schedule of this Tenement Document).
11. The Tenement Holder can only exceed the noise levels stipulated in Condition 10 if the Director of Mines:

- 11.1. Is satisfied, on the basis of information provided to him by an acoustic engineer, that the noise from the mining operation will not cause an adverse impact at the sensitive receiver due to the existing influence of ambient noise, or the limited duration and/or frequency of occurrence of the activity, and
- 11.2. provides prior approval for the exceedence.
12. The Tenement Holder must monitor noise levels on a continuous basis and report that data and meteorological monitoring data acquired by the Tenement Holder in real time to the public on an unrestricted internet site. The monitoring data must be retained and remain accessible on the unrestricted internet site for the life of the mine.
13. In the event that monitoring shows that Condition 10, subject to Condition 11, has been breached, the Tenement Holder must immediately cease the activity that resulted in the breach.

Meteorological Monitoring

14. The Tenement Holder must undertake meteorological monitoring in accordance with relevant Australian standards to measure and record meteorological data including (but not limited to) wind speed and direction, temperature, humidity, atmospheric pressure, solar radiation, rainfall and evaporation.

There are no Hillside Mine MPL and EML conditions (Second Schedule) relative to Noise.

3. NOISE OUTCOMES

The following Hillside Mine ML conditions (Sixth Schedule) relate to Noise.

Noise Outcomes

6. The Tenement Holder must, in construction and operation, ensure noise emanating from mining operations is in accordance with the current amenity as defined by the Yorke Peninsula Council Development Plan at the date that this Mineral Lease was granted.

Noise Strategies

7. The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(c) of the Regulations in relation to the outcome in Sixth Schedule Clause 6:
 - 7.1. Ensure the strategies associated with the design, control and management of all noise sources mitigate, or eliminate noise characteristics as defined by the relevant environment protection noise policy.
 - 7.2. At a minimum, implement all noise mitigation strategies described in the Proposal and Response Document.
 - 7.3. Investigate and implement further additional design and engineering measures or strategies to ensure achievement of the outcome in Sixth Schedule Clause 6, specifically in relation to the mitigation and elimination of noise characteristics as defined by the relevant environment protection noise policy.
 - 7.4. The presence, or otherwise, of tonal/modulating/impulsive/low frequency noise characteristics must be verified by a suitably qualified independent acoustic engineer (approved by the Director of Mines) within 3 months of the commencement of earthworks, or at a time as the Director of Mines may specify by notice in writing. The acoustic engineer

must prepare a report of the findings of the verification, and this report must be provided to the Director of Mines within 1 month of the completion of the verification.

- 7.5. Undertake continuous noise and meteorological monitoring to inform decisions for operational response and contingency measures to be implemented to prevent exceedence of compliance criteria.

Noise Criteria

8. The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(d) of the Regulations in relation to the outcome in Sixth Schedule Clause 6;
 - 8.1. criteria must include calculated noise limits as derived from the Environment Protection (Noise) Policy, and be consistent with Second Schedule Condition 10.
 - 8.2. Mine noise measured at, or for, noise-affected premises must be adjusted in accordance with the relevant environment protection noise policy by the inclusion of a penalty for each characteristic where tonal/modulating/impulsive/low frequency characteristics are present as identified by an acoustic engineer.

Also in accordance with the Sixth Schedule Clause 7.2, all the noise mitigation strategies for the current Hillside Mine plan described in the Mining Lease Proposal Response document are included in Table 7: in Section 7.2.

The following Hillside Mine EML conditions (Sixth Schedule) relate to Noise.

2. The Tenement Holder must, in construction and operation, ensure noise emanating from mining operations is in accordance with the current amenity as defined by the Yorke Peninsula Council Development Plan at the time of lease grant, set out in the Seventh Schedule of the Extractive Minerals Lease.
3. The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(c) of the Regulations in relation to the outcome in Sixth Schedule Clause 2 of the Extractive Minerals Lease:
 - 3.1. the Tenement Holder must ensure that separation distances between any extractive stockpiles and Pine Point ensure the achievement of the outcome in Sixth Schedule Clause 2.

There are no Hillside Mine MPL conditions (Sixth Schedule) relative to Noise.

4. BASELINE NOISE MEASUREMENTS AND MODELLING

Baseline noise monitoring for the proposed Hillside Mine was undertaken by independent acoustic engineer, AECOM in November 2012 (refer to the Hillside Mine Pre-Construction Noise Monitoring report, 9 November 2012).

Unattended noise measurements were collected at monitoring locations selected to be representative of the closest noise sensitive receptors surrounding the proposed Hillside Mine.

Noise data was logged in 15-minute intervals at all locations to include:

- maximum measured $L_{Aeq,15min}$, daytime and night-time;
- minimum measured $L_{Aeq,15min}$, daytime and night-time;

- median $L_{Aeq,15min}$, daytime and night-time;
- daytime and night-time ABL;
- highest night-time L_{Amax} ;
- $L_{Aeq,15\text{ hour}}$;
- $L_{Aeq,9\text{ hour}}$.

Daytime hours are defined as Australian Central Daylight Time (ACDT) 7:00am to 10:00pm. Night-time hours are defined as ACDT 10:00pm to 7:00am, and descriptors are reported for the date the measurement commenced. Table 1 provides the baseline noise logging locations and a summary of the noise levels applicable to the Hillside Mine.

Table 1: Summary of baseline noise logging results

Receptor No.	Location	Daytime (7am-10pm)			Night-time (10pm-7am)		
		Maximum $L_{Aeq,15min}$	Minimum $L_{Aeq,15min}$	Median $L_{Aeq,15min}$	Maximum $L_{Aeq,15min}$	Minimum $L_{Aeq,15min}$	Median $L_{Aeq,15min}$
11	40m south of a residence located 8km southwest of Ardrossan, off the Yorke Highway and 2.4km north of the Hillside Mine site.	56	30	45	51	24	34
8	Western boundary of residences at Rogues Point, approximately 8.5km south of Ardrossan town centre and 2km northeast of the Hillside Mine site.	60	34	49	53	25	37
25	Farming land 140m north of a residence off Redding Road. The monitoring location is approximately 6km northwest of Pine Point and 500m west of the Hillside Mine site.	54	27	42	46	25	34
34	Rex Minerals owned land, approximately 2.2km northwest of Pine Point and 2.4km southwest of the Hillside Mine site office.	56	30	45	49	28	37
38	The location is approximately 100m west of Pine Point, and 1.5km south of the Hillside Mine site.	54	29	42	44	23	32

No further baseline monitoring is planned prior to Project commencement as noise conditions are expected to be unchanged and Rex considers these measurements to be representative of the existing conditions.

In addition to baseline monitoring, predictive modelling of noise impacts was undertaken by independent acoustic engineer, Resonate Acoustics in August 2015 - refer to Appendix 3.5A of the PEPR (EFS Noise Impact Assessment August 2015). This incorporated the 2012 baseline data and the Extended Feasibility mine operations design and the detailed manufacturer's noise signature for the trucks and excavators selected.

Predictive modelling was conducted for construction Years 0 and 1 and operation Years 5 and 9, because these are the years where maximum mine activity occurs.

Modelling has shown the greatest potential for public nuisance will be due to operational noise from mobile plant working within the ML. The major sources of noise during Years 0, 1, 5 and 9 are shown in Tables 4, 7, 10 and 13 of Appendix 3.5A of the PEPR. The predicted levels of noise from the Hillside Mine during these time periods is shown in Figure 5 to Figure 7 of Appendix 1.

Modelling has shown that the revised truck selection and reduced operation and mining throughput (ie. less trucks) than originally outlined in the MLP has resulted in achievement of noise levels to be within the ML and EML conditions.

4.1 SCENARIO YEAR ZERO

A summary of the predicted night time noise levels for Year 0 under worst case and neutral weather conditions for the propagation of noise to the receptors is provided in Table 2.

Table 2: Predicted night time noise levels for Year 0

Receptor location	Noise EPP criteria, Leq dB(A)	Predicted night level, Leq dB(A)	
		CAT 4 (neutral)	CAT 6 (worst case)
	Night		
11	49	32	37
8	47	32	38
25	49	40	45
34	49	38	44
38	47	34	40

The predicted noise level meets the South Australian Environment Protection Authority (EPA) Environment Protection (Noise) Policy 2007 (Noise EPP) night-time criteria at all receptors under worst case conditions for propagation of noise, with the highest predicted noise level in Year 0 being 45 dB(A) at receptor 25.

4.2 SCENARIO YEAR ONE

A summary of the predicted night-time noise levels for Year 1 under worst case and neutral weather conditions for the propagation of noise to the receptors is provided in Table 3.

Table 3: Predicted night-time noise levels for Year 1

Receptor location	Noise EPP criteria, Leq dB(A)	Predicted night level, Leq dB(A)	
	Night	CAT 4 (neutral)	CAT 6 (worst case)
11	49	31	36
8	47	31	36
25	49	42	47
34	49	42	47
38	47	37	43

The predicted noise level meets the Noise EPP night-time criteria at all receptors under worst case conditions for propagation of noise, with the highest predicted noise level in Year 1 being 47 dB(A) at receptors 25 and 34.

4.3 SCENARIO YEAR FIVE

A summary of the predicted night-time noise levels for Year 5 under worst case, and neutral weather conditions for the propagation of noise to the receptors is provided in Table 4.

Table 4: Predicted night time noise levels for Year 5

Receptor location	Noise EPP criteria, Leq dB(A)	Predicted night level, Leq dB(A)	
	Night	CAT 4 (neutral)	CAT 6 (worst case)
11	49	35	40
8	47	35	40
25	49	38	43
34	49	44	49
38	47	36	41

The predicted noise level meets the Noise EPP night time criteria at all receptors under worst case conditions for propagation of noise, with the highest predicted noise level in Year 5 being 49 dB(A) at receptor 34.

4.4 SCENARIO YEAR NINE

A summary of the predicted night-time noise levels for Year 9 under worst case and neutral weather conditions for the propagation of noise to the receptors is provided in Table 5.

Table 5: Predicted night-time noise levels for Year 9

Receptor location	Noise EPP criteria, Leq dB(A)	Predicted night level, Leq dB(A)	
		CAT 4 (neutral)	CAT 6 (worst case)
	Night		
11	49	33	38
8	47	34	40
25	49	37	43
34	49	38	43
38	47	33	38

The predicted noise level meets the Noise EPP night time criteria at all receptors under worst case conditions for propagation of noise, with the highest predicted noise level in Year 9 being 43 dB(A) at receptors 25 and 34.

5. UNCERTAINTY ASSESSMENT

Key assumptions, recommended mitigation and management controls determined by Resonate Acoustics (2015) in predicting the noise impacts associated with the Hillside Mine operations are:

- the worst case noise modelling scenarios, based on the Hillside Mine plan over Years 0, 1, 5 and 9 are representative of actual future operations;
- the sound power levels adopted for modelling purposes were based on Resonate Acoustics' database of mining equipment that reflects the type and brand of actual equipment planned to be used at the mine and incorporates data obtained from equipment manufacturers such as equipment specification data;
- no annoying noise characteristics associated with operation of the haul truck fleet;
- the proportion of the time spent by the haul trucks in the pit, on the surface haul roads, and on the rock storage facilities (RSFs) are representative of actual future operations (note that the haul fleet is typically the major contributor to the mining operations noise emission).

Table 6 outlines actions to be taken during the early operational phase, to check that these assumptions are satisfactory.

Table 6: Actions to be taken to check noise related assumptions

Assumption	Action
Sound power of mobile and fixed plant	Acoustic Engineer to prepare a Sound Power Specification to assist with plant purchase decision-making.
Haul truck sound power levels and no presence of annoying noise characters	Acoustic Engineer to confirm haul truck manufacturer quoted dynamic sound power levels through site based attended measurements (on a mine site) including assessment of spectral characteristics. Acoustic Engineer will ensure that no obvious annoying noise characteristics occur, eg. planetary gear tonal noise emission under load, excessive retard grid blower noise, or cooling fan noise.
Mining operations noise emission predictions reliant on mining plan	Acoustic Engineer to confirm noise-modelling scenarios and plant sound power levels at commencement of mining operations and re-model as necessary to confirm noise impacts.

6. KEY RISKS

Predictive noise-modelling shows over the life of the Hillside Mine that exceedance of the noise criteria is not expected (Resonate Acoustics, 2015).

Potential noise sources associated with the Hillside Mine operations include:

- construction of the processing plant;
- topsoil recovery using excavators, dozers and trucks or scrapers;
- drill and blast activities;
- open cut mining using hydraulic excavators and haul trucks;
- overburden placement using trucks and dozer;
- haul road construction and maintenance using scrapers, dozers, graders, compactors and water trucks;
- overburden shaping utilising dozers;
- ore processing;
- copper concentrate transport by road to Port Adelaide;
- exploration drilling activities;
- land rehabilitation activities; and
- maintenance activities.

Potential noise impacts associated with the Hillside Mine operations include:

- public nuisance impacts from noise during mine construction;
- public nuisance from noise from fixed plant during operation; and
- public nuisance from noise from mobile plant during operation.

In relation to the identified risks, the greatest potential for public nuisance will be due to operational noise from mobile plant working within the ML. A key risk identified in the modelling is that the predicted noise level in scenario Year 5 under worst case weather conditions for the propagation of noise to sensitive receptor 34 will be borderline compliant. Whilst the modelling is undertaken at worst case weather conditions; scheduled operations, real-time continuous noise monitoring, the operational response process and ongoing communication with nearby receptors will manage these modelled risks.

7. NOISE CONTROL MEASURES

Management controls will be implemented throughout the Life of Mine to mitigate potential noise impacts. These controls are detailed in the following sections.

7.1 PROACTIVE AND RESPONSE NOISE MANAGEMENT

Proactive measures will be implemented by the Hillside Mine to manage noise emissions, with key aspects outlined below.

The Real-Time Continuous Noise and Meteorological Monitoring System will have the ability to notify relevant personnel when monitoring results indicate an exceedance of the trigger levels, or are at risk of exceeding the noise limits.

If Hillside Mine personnel receive notification of a noise non-compliance trigger, a review will be undertaken of the current mining operations (eg. plant locations and activities, meteorological conditions, etc.) to determine whether any modification to the operation is required to reduce the potential for noise-related impacts.

Because unattended measured noise levels are representative of all noise (ie. mine activities, agricultural activities, traffic, residential, fauna, wind, etc.), a real-time audio link will be provided at key locations to enable quick discernment of the influencing noise source. The acoustic engineer will provide training to selected on-site personnel to provide them with the ability to identify influencing noise sources and characteristics to be able to determine immediate corrective measures.

Hillside Mine personnel will investigate any reported exceedances of the noise criteria at private residences on a case-by-case basis in accordance with the Community Response Process. Should site specific monitoring or the real-time monitors indicate adverse noise impacts from the mine, reasonable and practicable measures to mitigate noise at the affected receptor will be investigated.

In addition to the response management process described above, the proactive forecasting of noise compliance risk will also be carried out by the monitoring system. This will be achieved by monitoring the forecast meteorological conditions in conjunction with the planned mobile plant operations. Should the risk be considered elevated, then operational plans will be changed accordingly (eg. not dumping on RSFs close to receptors). The effectiveness of the adopted operational control strategies will be monitored by the Real-Time Continuous Noise Monitoring System with operational adjustments made as necessary. It is envisaged that this process will improve as site-based experience increases.

The EML is subject to the same noise conditions, and any activities related to the EML in regard to loading and trucking of excess roadside aggregate will be undertaken during daylight hours and in such conditions as to minimise noise impacts. Any temporary stockpiling of excess roadside aggregate will be positioned in the southwest corner of the EML and away from Pine Point, however this is limited as any excess will be used in the construction of the Tailings Storage Facility (TSF), adjoining roads and/or placed within the RSFs.

7.2 MITIGATION MEASURES

Table 7 describes the mitigation measures for noise sources from the Hillside Mine and summarises the responsibilities that have been documented within this Plan.

If an activity results in noise with an adverse impact on amenity, all reasonable and practicable measures will be taken to minimise noise resulting from the activity to reduce its impact. This includes (but is not limited to) the following measures to the extent practicable:

Table 7: Noise sources, mitigation measures and responsibilities

Source	Noise mitigation measures	Responsibility	Timing
Design Measures			
Fixed and mobile plant	RSFs and stockpile areas have been designed to provide shielding from general onsite operations and processing to minimise noise impact to noise-sensitive premises, particularly to the south-east.	Mining Manager	Ongoing
	RSFs and stockpile areas will be constructed in a manner to enable mining equipment to operate in protected areas during adverse weather conditions.	Plant Operations Manager, Mining Manager	Ongoing
	Haul trucks that minimise the potential for annoying noise characteristics will be operated onsite.	Mining Manager	Ongoing
	Regularly reversing plant will be fitted with broadband reversing alarms to mitigate the nuisance associated with traditional tonal alarms.	Plant Operations Manager, Mining Manager	Ongoing
	The Hillside Mine plant, maintenance workshops and associated infrastructure are strategically located away from noise-sensitive premises.	Plant Operations Manager, Mining Manager	Ongoing
	Vegetation buffers will be developed to reduce noise/dust/light screening where appropriate.	Sustainability Manager	Ongoing
Construction Measures			
Fixed and mobile plant	Using off-site or other alternative processes that eliminate or lessen resulting noise.	Plant Operations Manager, Mining Manager	Prior to construction, ongoing
	When selecting mobile and fixed plant for purchase, apply appropriate sound power specifications to identify, eliminate or reduce (where reasonable and practicable) the potential for noise characteristics as defined by the Noise EPP.	Plant Operations Manager, Mining Manager	Prior to construction, ongoing
	Locating noisy equipment or processes so that their impact on neighbouring premises is minimised.	Plant Operations Manager, Mining Manager	Ongoing
	Ensuring that noise reduction devices such as mufflers are fitted and operating effectively.	Plant Operations Manager, Mining Manager	Ongoing

	Shutting or throttling equipment down whenever it is not in actual use.	Plant Operations Manager, Mining Manager	Ongoing
	Ensuring that equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation that is audible at noise-affected premises.	Plant Operations Manager, Mining Manager	Ongoing
	Operating equipment and handling materials to minimise impact noise.	Plant Operations Manager, Mining Manager	Ongoing
	Scheduling particularly noisy activities to commence after 9:00am where reasonable and practicable to do so.	Plant Operations Manager, Mining Manager	Ongoing
Operational Measures			
Fixed and mobile plant	Use of Real-Time Continuous Noise and Meteorological System monitoring information incorporating automatic alarms that will enable mine operators to take a proactive approach to minimising noise impacts by modifying or temporarily ceasing operations when monitoring indicates that potential impacts may occur, such as: <ul style="list-style-type: none"> restricting operations during adverse weather conditions on the outer stockpile faces or elevated stockpiles in sensitive areas, where practicable; diverting haul trucks or specific types of haul trucks (dependent on the final haul truck fleet mix) to alternative rock storage facilities or stockpiles; relocating rock breaking activities and operating during the day period only as outlined in Section 3, and Sixth Schedule Clause 7.2 of the Hillside Mine ML. limiting the reverse gear selection of tracked bulldozers to no higher than second gear during the night to minimise dozer 'track slap' noise (which is an annoying impulsive noise characteristic). 	Plant Operations Manager, Mining Manager	Ongoing
	Use of unattended Real-Time Continuous Noise and Meteorological System monitoring for mine operational management to minimise the risk of exceedance of the noise criteria.	Mining Manager	Ongoing
	Not mixing the operation of attenuated and non-attenuated haul trucks on the southern waste rock storage facility haul routes to minimise noise annoyance associated with alternating noise characteristics.	Mining Manager	Ongoing
	Ensure fixed plant is maintained such that noise emissions do not increase above the specified levels over the lifespan.	Plant Operations Manager	Ongoing

	Maintain mining equipment to high standards to ensure availability and to minimise the potential for unusual annoying noise characteristics.	Mining Manager	Ongoing
	A sample of site mobile plant will be tested to ensure ongoing compliance with sound power specifications applicable to the mobile plant. Any plant identified as being outside the allowed parameters, or with absent or damaged attenuation, will be reported to the maintenance department for rectification.	Plant Operations Manager, Mining Manager	Ongoing
	Regularly liaise with the community to obtain feedback on the operational noise and any suggested improvements for Rex Minerals to consider.	Sustainability Manager	Ongoing
	Where specific complaints are received in relation to noise at a particular residence, noise monitoring may be carried out in consultation with the complainant to monitor noise impacts at the relevant location.	Sustainability Manager	As required
	At commencement of shifts (night shift will be the main focus), the potential for noise compliance risk will be evaluated using forecast meteorological conditions (eg. wind speed and direction) and will be taken into account with planned mobile plant operations by the shift supervisor. Should the risk be considered elevated, then operational plans will be changed accordingly (eg. not dumping on RSFs close to receptors). It is envisaged that this process will improve as site-based experience increases.	Shift Supervisor	Ongoing
Operational Response Processes			
NMP	Operate in accordance with this NMP and implement procedures contained within this management plan.	All employees	Ongoing
	Ensure the Real-Time Continuous Noise and Meteorological System network is maintained and results are routinely analysed, assessed and reported.	Sustainability Manager	In accordance with Section 10
	Receiving, reporting and responding to any complaints in relation to noise through the 24-hour community response line.	Sustainability Manager	Ongoing
	In the event of exceedance of the noise limits, the situation should be reported to the Operations Manager.	Operations Manager	Ongoing
	Report the results of any noise monitoring in accordance with the ML conditions.	Sustainability Manager	As required
	Ensure that all employees and contractors are given adequate training in environmental awareness, legal responsibilities, and noise control methods.	Sustainability Manager	Ongoing
	Any corrective action as an operational response will be recorded and reported to the Senior Environment Advisor who is to keep a	Sustainability Manager	Ongoing

	record of all significant proactive and response actions. The Community Relations Advisor must be informed of any complaint and details must be recorded in the complaints register in addition to response and actions taken.		
	A review to determine whether there is any relationship between short-term noise episodes, and the frequency of noise-related community complaints will be ongoing and summarised annually and reported in the Annual Compliance Report (ACR).	Senior Environment Advisor, Sustainability Manager	Annual

8. CONSULTATION

This Plan is being prepared in consultation with the Department of the Premier and Cabinet (DPC), the EPA, Yorke Peninsula Council, the Hillside Mine Community Voice (HMCV) consultation group and directly with local landowners. Engagement with the DPC and HMCV will take place prior to any proposed change to the guideline noise limits.

9. RESPONSE PROCEDURES

9.1 OPERATIONAL RESPONSE PROCESS

The Real-Time Continuous Noise and Meteorological Monitoring System will be recorded to inform decisions for operational response and contingency measures to be implemented to prevent exceedance of compliance criteria. Noise measurement criteria guideline limits and trigger levels are outlined in Table 8 and noise levels that trigger a response procedure are outlined in Table 9.

Table 8: Noise measurement criteria guideline limits and trigger levels

Receiver Zone	ACDT	ML & EML Noise Limit (L _{Aeq}) (NTL3)	Leading Indicator Criteria Level (L _{Aeq}) (NTL2)	Operational Trigger Level (L _{Aeq}) (NTL1)
Primary production	Day (7:00am to 10:00pm)	56 dB(A)	54 dB(A)	51 dB(A)
Settlement (Pine Point & Rogues Point)	Day (7:00am to 10:00pm)	54 dB(A)	52 dB(A)	49 dB(A)
Primary production	Night (10:00pm to 7:00am)	49 dB(A)	47 dB(A)	44 dB(A)
Settlement (Pine Point & Rogues Point)	Night (10:00pm to 7:00am)	47 dB(A)	45 dB(A)	42 dB(A)
Meteorological Monitoring	Measure and record wind speed and direction, temperature, humidity, atmospheric pressure, solar radiation, rainfall and evaporation.			

Table 9: Trigger levels and description of triggered responses (suggested for commencement of operations)

Trigger Level	Receiver zone / ACDT	Noise Limits (L _{Aeq})	Description response triggered
NTL1	Primary Production / Day	51 dB(A)	The noise level trend exceeds the NTL1 trigger level at one or more stations: 1. Listen to the real-time audio feed to assess the noise event and characteristics. 2. If the noise event is not due to mining operations, then no further action is required. 3. If the noise event is caused by mining operations, check the location of plant and equipment nearest the monitoring station(s). 4. Is a dominant annoying noise characteristic(s) present? If yes, apply noise control measures as soon as practicable to minimise the potential for exceedance of noise compliance limits. 5. Consider the current/forecast meteorological conditions with respect to mobile plant locations and plan operations accordingly. Considering the hourly noise trend will inform operations if the trend is only just beginning to rise, or whether the trend is at a sustained higher level. This informs the timing of the actions required.
	Settlement (Pine Point & Rogues Point) / Day	49 dB(A)	
	Primary production / Night	44 dB(A)	
	Settlement (Pine Point & Rogues Point) / Night	42 dB(A)	
NTL2	Primary Production / Day	54 dB(A)	The noise level trend is either rising and a response to NTL1 may not be sufficient, or there has been a step in impacts from below NTL1 to NTL2. This could be due to an increase in site activity, rising ambient noise contributions or a change in meteorological conditions. If the NTL2 level is triggered without previously triggering NTL1, complete the NTL1 review bearing in mind that NTL2 is now also triggered. NTL2 requires a heightened awareness and urgency to noise management and control. This also means that immediate action must be taken to control any identified annoying noise characteristics with current operations. If applied noise control measures are not sufficient and additional measures are not available, consider restricting operations.
	Settlement (Pine Point & Rogues Point) / Day	52 dB(A)	
	Primary production / Night	47 dB(A)	
	Settlement (Pine Point & Rogues Point) / Night	45 dB(A)	
NTL3	Primary Production / Day	56 dB(A)	This is a prompt that a noise limit has potentially been exceeded.

Trigger Level	Receiver zone / ACDT	Noise Limits (L _{Aeq})	Description response triggered
	Settlement (Pine Point & Rogues Point) / Day	54 dB(A)	Immediate action to mitigating the site noise emission must be undertaken. The margin for this decision will need to be evaluated by an Acoustic Engineer on a case by case basis.
	Primary production / Night	49 dB(A)	
	Settlement (Pine Point & Rogues Point) / Night	47 dB(A)	

9.2 EXCEEDANCE PROTOCOL

9.2.1 Attended Monitoring Exceedance

In situations where exceedance of the conditions has occurred, an acoustic engineer will differentiate between mine and ambient noise. If the exceedance is due to mine-related activities the following actions will be undertaken:

- The Senior Environmental Coordinator must be notified as soon as practicable of any exceedance identified during attended monitoring.
- The Senior Environmental Coordinator will investigate the results of the noise monitoring for the potential causes for the exceedance.
- Notify the relevant Departmental Manager in order to cease the activity that caused the breach of conditions and rectify the causes for the exceedance.
- On-shift Mine or Plant Supervisor to be notified, exceedance noise source identified and immediate actions taken.
- The DPC will be notified in the case of noise limit exceedances within 24 hours.
- The HMCV will be notified in the case of noise limit exceedances during quarterly communications.

A noise exceedance can be allowed as outlined in the Second Schedule condition 11 of the Hillside Mine ML with prior approval of the Director of Mines.

9.2.2 Independent Review

If a landowner of privately owned land considers the Hillside Mine to be exceeding the noise measurement criteria in the ML and/or EML, further noise monitoring units may be carried out in consultation with the complainant to monitor noise impacts at the relevant location. If a mutual agreement cannot be reached then an independent review will be undertaken by an acoustic engineer.

9.3 COMMUNITY RESPONSE PROCESS

All noise complaints received in relation to the Hillside Mine operations will be responded to in accordance with the Complaints Management Procedure EC PRO 320 (refer Appendix 4.7 of the PEPR). This procedure details the obligations of the Hillside Mine in regard to receiving, handling, responding to, and recording details of all community complaints. Upon receipt of a complaint from the community, preliminary investigations will commence within twenty-four hours to determine the likely causes of the

complaint using information such as the prevailing meteorological conditions, the nature of noise generating activities, the location and recent monitoring results. A response will be provided as soon as practicable (preferably within forty-eight hours) which may include the provision of relevant monitoring data if requested.

Where specific complaints are received in relation to noise at a particular residence, noise monitoring may be carried out in consultation with the complainant to monitor noise impacts at the relevant location.

Every effort will be made to ensure that concerns are addressed in a manner that facilitates a mutually acceptable outcome for both the complainant and Rex Minerals.

Rex Minerals will record all community complaints into the Complaints Register in accordance with the Community Response Process. The database will include reporting, incident/event notification, close out action tracking, inspection and audits. These complaints will be communicated with the HMCV on a quarterly basis in addition to being documented within the Annual Compliance Report (ACR).

10. MONITORING PROGRAM

The monitoring program is specific as to how and when monitoring is undertaken and provides guidelines for analysis, reporting and equipment calibration intervals. In accordance with the Hillside Mine ML conditions, the noise limits applicable to the Hillside Mine, when assessed at noise-affected premises, are provided in Table 10.

Furthermore, the mine noise emissions can only exceed the noise limits if the Director of Mines:

- is satisfied, on the basis of information provided by an acoustic engineer, that the noise from the mining operation will not cause an adverse impact at the noise-affected premises due to the existing influence of ambient noise, or the limited duration and/or frequency of occurrence of the activity, and
- provides prior approval for the exceedance.

Table 10: Hillside Mine ML noise limits

Receiver zone	ML Noise limits (L _{Aeq})	
	Day (7:00am to 10:00pm)	Night (10:00pm to 7:00am)
Primary production	56 dB(A)	49 dB(A)
Settlement (Pine Point & Rogues Point)	54 dB(A)	47 dB(A)

In comparing the measured Hillside Mine noise levels at noise-affected premises to the noise limits, the noise level is to be adjusted in accordance with the Noise EPP by the inclusion of a penalty for each annoying noise characteristic. Penalties for annoyance relate to tonal/modulating/impulsive/low frequency characteristics when they are present, as identified by an acoustic engineer during attended noise monitoring and audits for compliance. The acoustic engineer will provide training to selected on-site personnel to provide them the ability to identify influencing noise sources and characteristics to be able to determine immediate corrective measures.

For a characteristic penalty to be applied to a noise source, it must be fundamental to the impact of the noise and dominate the overall noise impact. The potential for a characteristic penalty to apply has been discussed in the Noise Impact Modelling Assessment carried out by Resonate Acoustics (2015).

Operational noise measurements carried out and compared against the indicative noise levels, under the Noise EPP, can be adjusted by the following amounts if the noise source contains modulation, tonal, impulsive, or low-frequency characteristics:

- +5 dB(A) if the noise source contains 1 characteristic;
- +8 dB(A) if the noise source contains 2 characteristics;
- +10 dB(A) if the noise source contains 3 or 4 characteristics.

Operations will note ambient conditions and schedule daytime activities accordingly to avoid disturbance with focus to the identified worse case predicted noise at receptors identified in modelling.

10.1 MONITORING LOCATIONS AND FREQUENCY

The noise monitoring requirements for the Hillside Mine will cover two key areas: routine compliance audits, and operational noise management on a continuous basis.

Noise monitoring stations and audio link equipment will be installed, operated and calibrated as recommended by an acoustic engineer and manufacturer requirements to ensure compliance with the Noise EPP.

The monitoring program is provided in Table 11 with the locations also identified in Figure 3 of Appendix 1.

Table 11: Noise Monitoring Program

Site No.	Monitoring Equipment	Monitoring Type/ Frequency	Approximate Coordinates (MGA)	Purpose
W1	Weather station	Continuous	762006E 6177264N	Record of meteorological conditions relating to all noise measurements
C1	Noise monitoring station + audio link	Unattended Continuous	764121E 6179656N	Operational noise management
C2	Noise monitoring station + audio link	Unattended Continuous	760236E 6179171N	Operational noise management
C3	Noise monitoring station + audio link	Unattended Continuous	760135E 6175280N	Operational noise management
C4	Noise monitoring station + audio link	Unattended Continuous	762354E 6172675N	Operational noise management
C5	Noise monitoring station + audio link	Unattended Continuous	765652E 6178963N	Operational noise management
A1	NATA calibrated Class 1 Sound Level Analyser + noise logger	This site is no longer required as site C5 will be a replacement for noise monitoring and audio link.		
A2	NATA calibrated Class 1 Sound Level Analyser	Attended 1–3 months*	764259E 6179673N	Noise Limit compliance audit
A3	NATA calibrated Class 1 Sound Level Analyser	Attended 1–3 months*	760315E 6179092N	Noise Limit compliance audit

Site No.	Monitoring Equipment	Monitoring Type/ Frequency	Approximate Coordinates (MGA)	Purpose
A4	NATA calibrated Class 1 Sound Level Analyser + noise logger	Attended 1–3 months*	759905E 6177324N	Noise Limit compliance audit
A5	NATA calibrated Class 1 Sound Level Analyser + noise logger	Attended 1–3 months*	762211E 6172219N	Noise Limit compliance audit
A6	NATA calibrated Class 1 Sound Level Analyser + noise logger	Attended 1–3 months*	764161E 6171238N	Noise Limit compliance audit
A7	NATA calibrated Class 1 Sound Level Analyser + noise logger	Attended 1–3 months*	764274E 6166838N	Noise Limit compliance audit

* It is envisaged that attended compliance audits carried out by an acoustic engineer will be conducted during construction and initial operations with attended monitoring at one month intervals until the correlation of meteorological conditions, operational activities and the relationship between noise levels at both the continuous and compliance audit locations are well understood. The monitoring frequency will be reviewed annually in consultation with relevant stakeholders.

There will not be a continuous monitoring site at Pine Point as it is considered to be too close to the highway and will have greater background noise, therefore the slightly inland continuous monitoring location (C4) is better for real-time monitoring. In addition, there will be one attended noise monitoring site at Black Point (A7).

The continuous monitoring system with audio-link will provide sufficient information to generally assess compliance against the noise limits. However, it is not considered to be a formal measure of compliance in accordance with the Noise EPP. A formal assessment of compliance requires the attendance of an acoustic engineer during measurements to accurately consider site context, take account of the contribution of other ambient noise to mine noise and whether a penalty is applied for noise character. However, an acoustic engineer will also be able to assess the data recorded by the continuous monitoring system to ascertain compliance, although not to the level of certainty such as that achieved when in attendance.

10.2 MONITORING METHODOLOGY

The following sections describe the noise and meteorological monitoring methodology for the Hillside Mine operational management and compliance.

10.3 REAL-TIME CONTINUOUS NOISE MONITORING

10.3.1 Mine operational management

Real-time continuous noise monitoring is a proactive way to manage noise impacts at the Hillside Mine. Real-time continuous noise monitoring allows noise levels and local meteorological data to be analysed and compared against noise compliance predictions.

The continuous noise monitoring system will provide real-time data on the ambient noise environment from each monitoring site (see Figure 1). The system will also incorporate a real-time audio feed to assist mine operators to identify contributing noise sources relating to the displayed real-time noise levels, as well as prevent unnecessary response to false alarms. Furthermore, audio storage on triggered alarm events will also be used to enable noise source identification and assessment at a later date.

The Real-Time Continuous Noise and Meteorological Monitoring System will be programmed to alert key Hillside Mine personnel when a trigger noise level is exceeded (refer to 9.1 Operational Response Process above) as illustrated in Table 9. Following the alert, a review of operations and current meteorological conditions will be undertaken to minimise the risk of noise limit exceedances.

Historical data from the real-time monitoring system, in conjunction with compliance monitoring data, will be reviewed by an acoustic engineer to establish any correlation between meteorological conditions and high noise levels from the Hillside Mine operations. This assessment will be more intensive at the commencement of mining operations to accelerate understanding of the noise levels at the mine site.

The unattended real-time continuous noise monitors will also provide the following functionality:

- a complete representation of all noise at the monitoring location throughout the period, with results showing night and day and seasonal variations;
- spectral noise data suitable for comparison with annoyance character investigations;
- a mechanism to alert Hillside Mine personnel when noise levels are approaching the relevant noise limit (corrected for the monitoring location), so that the mining operation can be managed accordingly;
- supplemental data for noise investigations initiated in response to community complaints or noise exceedances;
- data that can be used to determine correlations between mining operations, meteorological conditions and environmental noise levels.

The unattended continuous noise monitors will record the following information:

- date and time;
- LA_{eq} for each 15-minute interval;
- LA_{min} , LA_{90} , LA_{10} and LA_{max} for each 15-minute interval;
- 15-minute one-third octave LA_{eq} noise levels corresponding to the LA_{eq} 15-minute interval (shorter time intervals can also be stored through setting adjustments);
- continuous weather data monitoring for wind direction, speed, temperature and rainfall as 15-minute averages (data from site weather station);
- alarm event audio recording for subsequent playback and analysis.

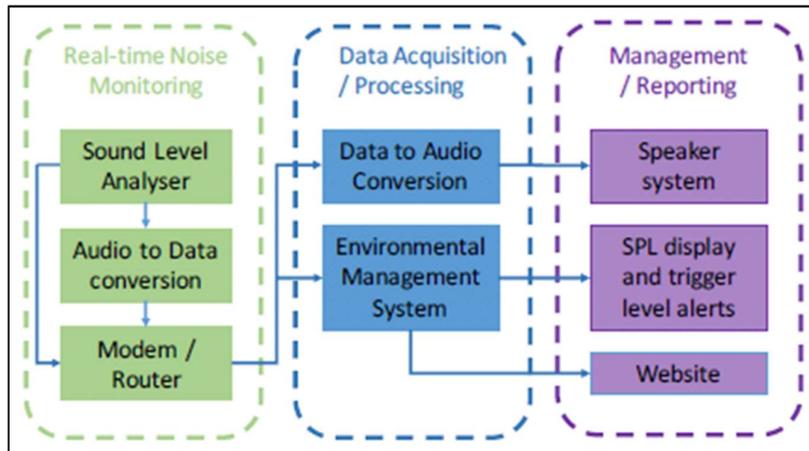


Figure 1: Real-time noise system

10.3.2 Public internet site

The public internet site will record and display the following information from each continuous monitoring location for the life of the mine:

- date and time;
- LA_{90} and LA_{eq} for each 1-hour interval (updated in real-time within 30 minutes);
- continuous weather data monitoring for wind direction, speed, temperature and rainfall as hourly averages (updated in real-time within 30 minutes).

10.4 ROUTINE NOISE COMPLIANCE AUDITS

An independent acoustic engineer will carry out routine compliance audits through using a mix of attended and unattended noise monitoring. It is envisaged that these compliance audits will be conducted during construction and initial operations with attended monitoring at one month intervals until the correlation of meteorological conditions, operational activities and the relationship between noise levels at both the continuous and compliance locations are well understood. The monitoring frequency will be reviewed annually in consultation with relevant stakeholders.

Sensitive receptor locations (refer Figure 2) were evaluated following consultation with acoustics specialists and landowners. Attended and unattended noise monitoring will be undertaken at the locations nominated in Figure 3, Appendix 1. These are in accordance with the EPA Guidelines for the use of the Environment Protection (Noise) Policy 2007 and Australian Standard AS 1055 Acoustics, Description and Measurement of Environmental Noise.

Observation times for attended monitoring will be determined by the acoustic engineer and take into consideration meteorological conditions and operations to capture maximum mine noise.

The attended noise monitoring surveys are used to quantify and describe the acoustic environment at each monitoring location. These results will be compared with the real-time continuous monitoring data, audio-link data and noise criteria defined in Sections 2 and 3. The real-time continuous and audio-link data will decipher what is mine noise compared to ambient noise. Attended noise monitoring is often considered the preferred method for determining compliance with prescribed limits because it allows for an accurate determination of the contribution made by mining noise sources, if any, to measured ambient noise levels.

The attended noise monitoring program is used to:

- identify individual sources contributing to the ambient noise environment;
- quantify mine noise levels;
- determine whether an annoyance character penalty (in accordance with the Noise EPP) should be applied to the contributing mine noise levels;
- gain an understanding of the effects of meteorological conditions on the propagation of the noise from Hillside Mine operations to the monitoring location.

Given that the Hillside Mine will operate 24 hours per day, it will be sufficient to prove compliance by monitoring during the night period with the assumption that compliance would then result during the day period. For the purposes of attended monitoring, the night time period is defined as ACDT 10:00pm to 7:00am.

Daytime ambient noise, eg. traffic, farm equipment, local household noise, means the impact of mine generated sources are far less. Baseline monitoring has confirmed this. Hence attended monitoring is planned at worst case conditions, eg. night, low wind. Experience with EPA and other sites suggests this is the case.

Additional reasons for attended monitoring during night only are:

- the night criterion is 7dB(A) more stringent than the day;
- meteorological conditions during the night will typically be more noise enhancing;
- other activities (farming, road traffic, etc.) are more common during the day, making it difficult to measure the source of interest;
- given the prevailing weather conditions of the area, wind during the day is likely to be above speeds during which monitoring can effectively take place as once wind speed is over ~3-5 metres per second, the wind overrides other noise sources. Ambient noise is lower at night, therefore this is the best time for attended monitoring.

Each attended noise survey will comprise at least one 15-minute measurement at nominated locations during the night, following noise logger placement during the day, and another 15-minute measurement upon pick-up of the noise loggers post seven to 14 days' time.

For each 15-minute monitoring period, the following information will be recorded:

- operator's name;
- monitoring location;
- date and time that monitoring began at each location;
- quantitative meteorological data such as temperature, wind speed, wind direction and humidity;
- qualitative meteorological information such as cloud cover (ie. octa rating), fog and rainfall;
- instrument calibration details before and after the monitoring period;
- the measure value (or contribution) of the Hillside Mine $LA_{eq,15\text{-minute}}$;
- the overall $LA_{eq,15\text{-minute}}$;
- statistical noise level descriptors: LA_{90} , LA_{10} , and LA_{max} ;

- measuring of the C-weighted noise levels (in addition to the A-weighted noise levels);
- measurements in one-third octave bands from 25 Hz to 10 Kilo Hertz (kHz) inclusive (or a broader range of bands) to assess if the mining noise has characteristics that may require character penalties to be applied;
- the use of a suitable low-pass filter (ie. measurement of lower frequency noise less than 1000 Hertz (Hz)) may be used to assist the determination of contributed noise from the Hillside Mine should higher frequency extraneous noise be an issue;
- if any of the data in a 15-minute period is affected by rain or wind speeds in excess of 5 m/s then another entire 15-minute period of data unaffected by rain or excessive wind will be undertaken.

Unattended noise logging for a period of at least seven consecutive days may supplement the attended monitoring to determine if any noted (or not) impacts are systemic/sustained over the logging period. The noise loggers will have the same capability and calibration stringency as the attended instruments for the purposes of assessing noise. The instruments will also incorporate an audio recording function for cases when an alarm limit is triggered. Interrogation of the captured audio events in combination with the analysis of the statistical noise data and meteorological conditions for the corresponding time period will allow identification of the event. Real-time noise monitoring will determine when a trigger point or a lease condition point is reached. Noise loggers can record noise levels or frequencies over periods of time. Attended monitoring can accurately determine actual mine noise compared with ambient noise. A combination of all three is planned to be used to ensure the mine is in compliance.

10.5 METEOROLOGICAL MONITORING

Local meteorological data collected during attended monitoring will also be supplemented by more detailed data from the Hillside Mine weather station. The weather station is currently located within the Hillside Mine ML and complies with Australian Standard AS/NZS 3580.14:2014 *Methods for sampling and analysis of ambient air - Meteorological monitoring for ambient air quality monitoring*. The logged meteorological parameters include:

- wind speed at 10 metres above ground;
- wind direction at 10 metres above ground;
- sigma-theta from sampled wind direction measurements;
- temperature at two metres and 10 metres above ground;
- solar radiation;
- rainfall.

Real-time continuous data from the weather station will be provided in conjunction with the noise data to assist correlation of meteorological effects. This data will be made available to the public via an unrestricted internet site.

In some cases, data from the air quality compliance monitoring stations may be utilised to correlate against the noise data.

10.6 METEOROLOGICAL FORECAST ANALYSIS

Data from the Hillside Mine weather station and forecast data from the Bureau of Meteorology (BOM) will be utilised to identify the potential for noise enhancing conditions.

Meteorological factors that will be considered in the forecast analysis include:

- Wind speed and direction. Note that the worst case conditions for the propagation of sound will not occur at all noise-sensitive premises simultaneously, as receptors on one side of the site are upwind while those on the opposite side are downwind. Relatively low wind speeds (less than 3 m/s) are also likely to result in the most audible mine noise at noise-sensitive premises, as the masking noise is likely to be less during the periods of low wind speed. Conversely, high wind speeds will result in increased background noise at receptors, and therefore a reduced audibility of the mine noise during these times.
- Atmospheric (Pasquill) stability class. The atmospheric stability class is dependent on a range of factors including the level of incoming solar radiation, wind speed, and degree of cloud cover.

The assessment of these factors will be automated with the intent to advise Hillside Mine operators of high risk meteorological conditions, where increased audibility of mining activities could lead to a higher probability of noise complaints.

11. REPORTING

Rex Minerals will engage an acoustic engineer (approved by the Director of Mines) within three months of the commencement of earthworks, or at a time as the Director of Mines may specify by notice in writing, to verify the presence, or otherwise, of tonal/modulating/impulsive/low frequency noise characteristics.

Rex Minerals will report on the performance of this Plan in the ACR and provide regular updates to members of the HMCV consultation group. The ACR will include:

- noise monitoring results and comparison to performance criteria;
- noise-related complaints and management/mitigation measures undertaken;
- management/mitigation measures undertaken in the event of any confirmed exceedance of performance criteria; and
- review of the performance of management/mitigation measures and the monitoring program.

The ACR will also be submitted to the HMCV and made available for public information on the Rex Minerals website.

Attended noise monitoring results will also be published regularly on a public website that will be linked to the Rex Minerals website.

12. PERFORMANCE INDICATORS

The following performance indicators will be measured against the ML and EML conditions:

- Compliance with relevant noise standards at all compliance monitoring locations.
- Minimisation of noise complaints as evidenced by trends in the frequency and extent of complaints.
- Compliance with this Plan, as indicated by internal and statutory reporting.

13. CONTINUAL IMPROVEMENT

The Hillside Mine will strive to continually improve on the mine's environmental performance by applying the principles of best practice to mining operations, including where cost-effective and practicable, the adoption of new best practice technologies and improved noise control measures. Progress will be monitored using the above noted performance indicators in Section 12.

Particular attention will be paid to mobile plant noise control, primarily in regard to trucks and dozers. These are likely to be the major site noise sources and represent the area of most development by equipment manufacturers. Noise monitoring and sound power testing results will be evaluated on an ongoing basis to ascertain plant condition and the extent of improvement that may be required.

During the early operational stage, Rex Minerals intends to investigate the correlation between meteorological conditions and noise levels to allow proactive management procedures to be refined. This Plan will be reviewed and revised based on the outcomes of this investigation in consultation with the DPC and the EPA.

14. REVIEW

This Plan will be reviewed on an annual basis, and if necessary revised to the satisfaction of the DPC (in consultation with relevant government agencies), if:

- there are changes to Project approval or licence conditions relating to noise management or monitoring;
- significant incidents occur at the Hillside Mine relating to noise;
- an independent environmental audit requires changes to the NMP or to monitoring practices; or
- there is a relevant change in technology or legislation.

15. REFERENCES

AECOM, Hillside Mine Pre-construction noise monitoring, Document No. 60279729-A12K01RP, 9 November 2012.

AECOM, Hillside Mine Construction noise and vibration management plan, Document No. 60279729-A12L01RP-3, 4 July 2013.

AECOM, Hillside Mine Operational Noise Assessment, Doc No. 60279729-A13A01RP-3, 22 August 2013.

EPA, Guidelines for use of the Environment Protection (Noise) Policy 2007.

Resonate Acoustics, Hillside Project – Extended Feasibility Study – Environmental Noise Impact Assessment, Doc No. A15399RP1, Revision A, 31 August 2015.

Government of South Australia, Mineral Lease 6438, 16 September 2014.

Australian Standard (1997) AS1055.1-1997 *Acoustics—Description and measurement of environmental noise Part 1: General procedures*.

Australian Standard (1990) AS 1259.2 *Acoustics – Sound level meters – Part 2: Integrating – Averaging*.

Australian Standard (2014) AS/NZS3580.14 *Methods for sampling and analysis of ambient air – Meteorological monitoring for ambient air quality monitoring*.

16. APPENDICES

Appendix 1: Location Maps

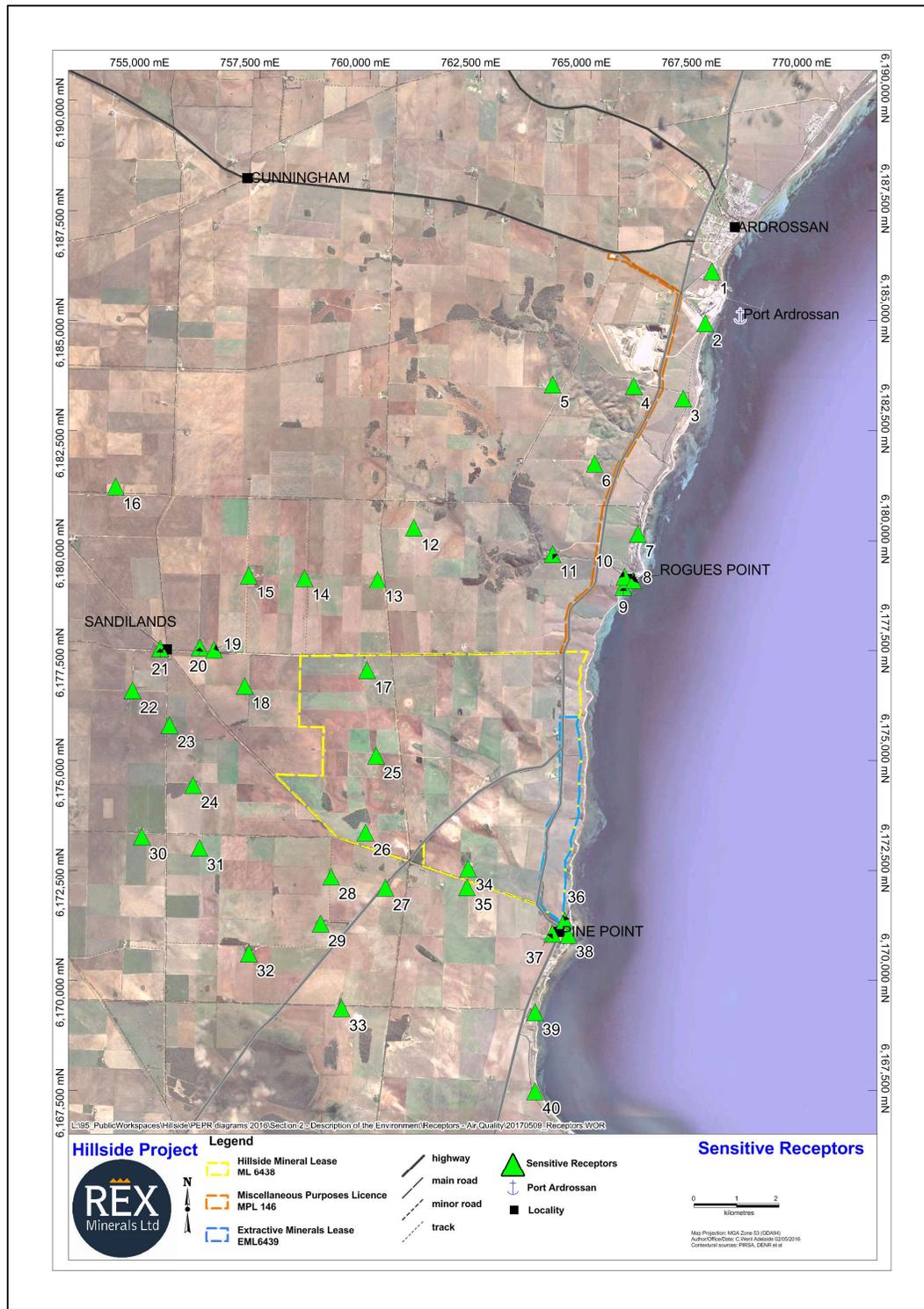


Figure 2: Sensitive Receptor Locations

Hillside Copper Mine
 Noise Management Plan
 Program for Environment Protection and Rehabilitation (PEPR)

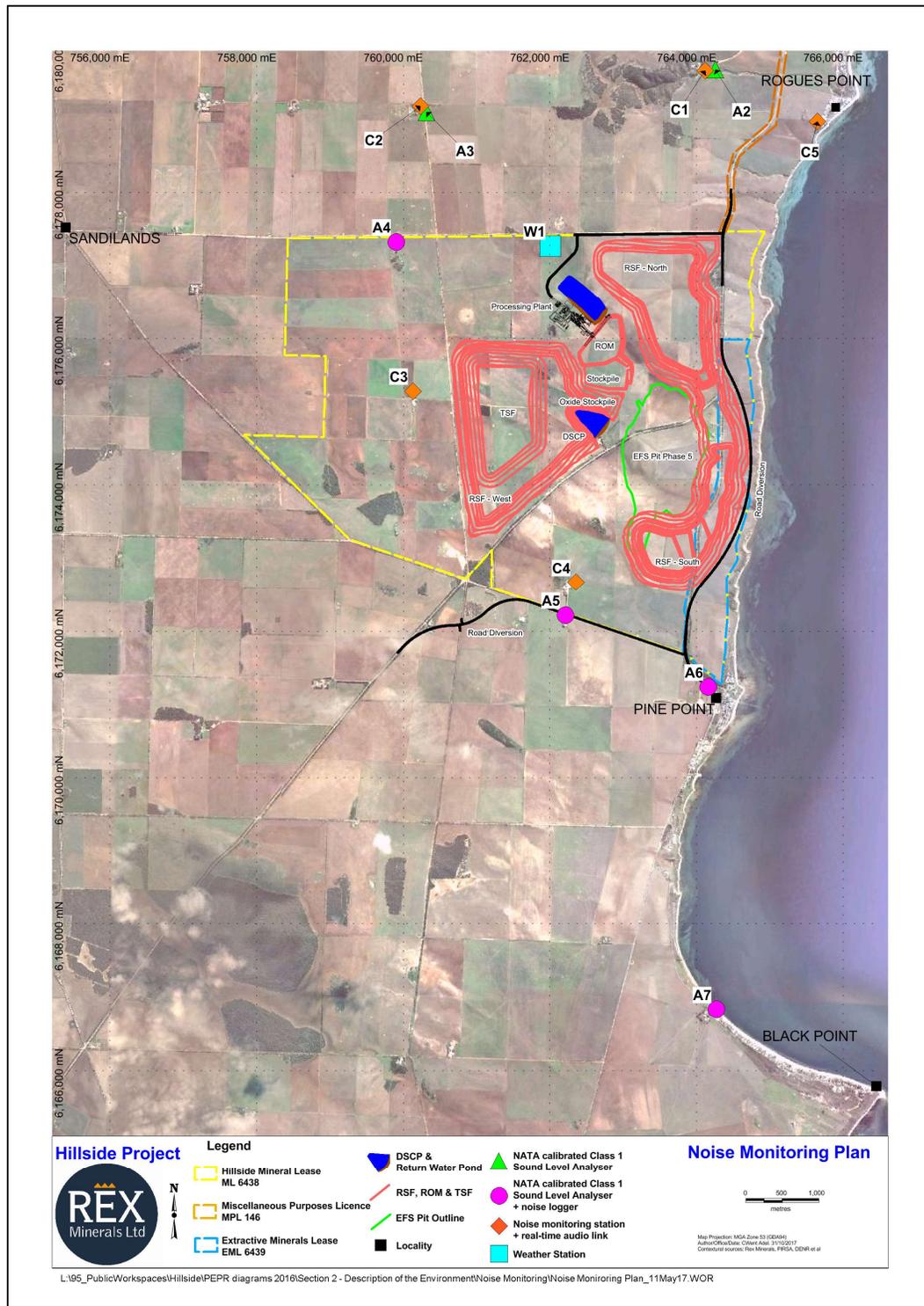


Figure 3: Noise Monitoring Plan/Locations

Monitoring locations – preliminary sites have been indicated with exact locations to be determined following consultation with noise monitoring experts and landowners

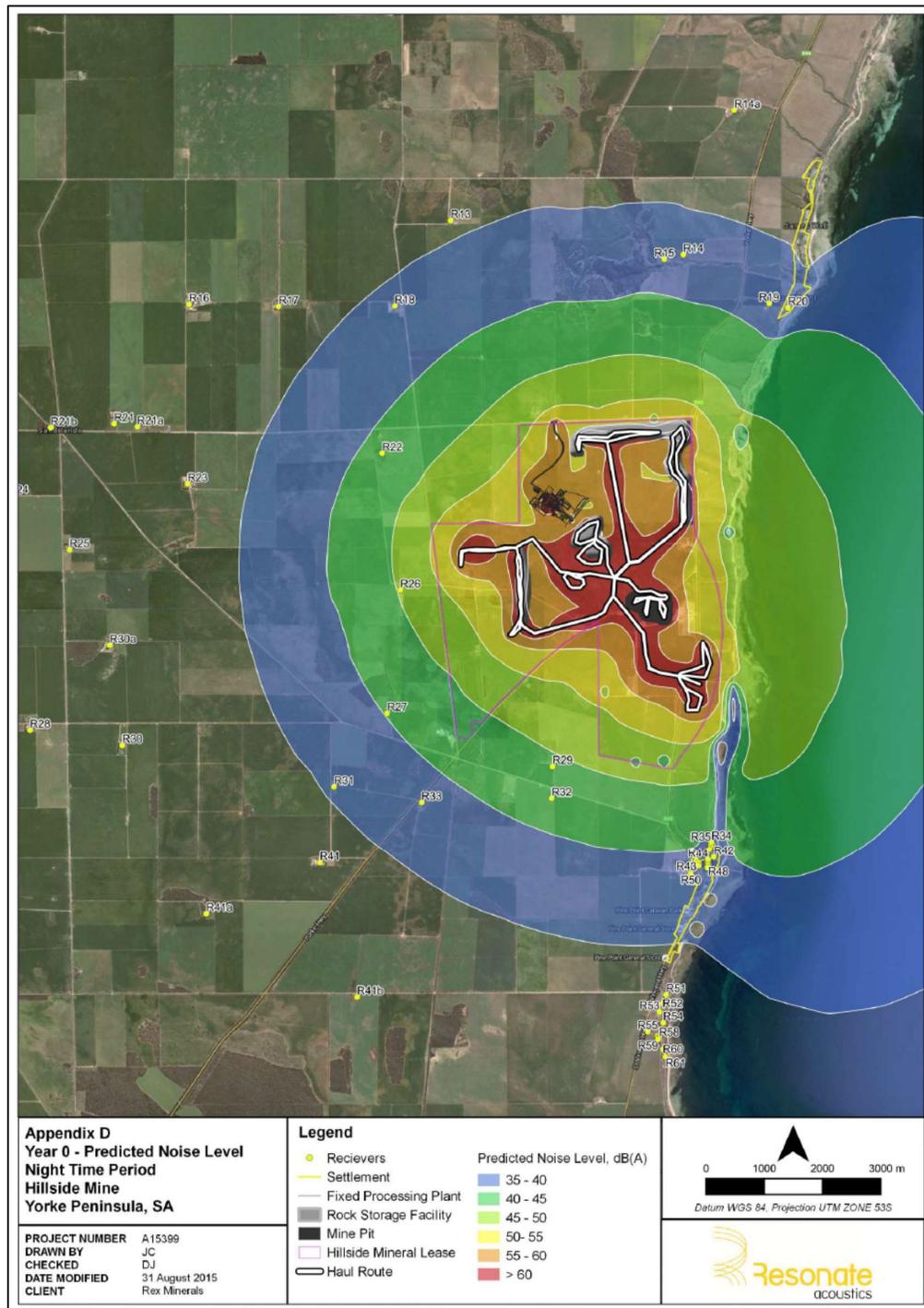


Figure 4: Year 0 Predicted Noise Level

Note: The blue shaded outermost area is equivalent to average background noise on local farmland.

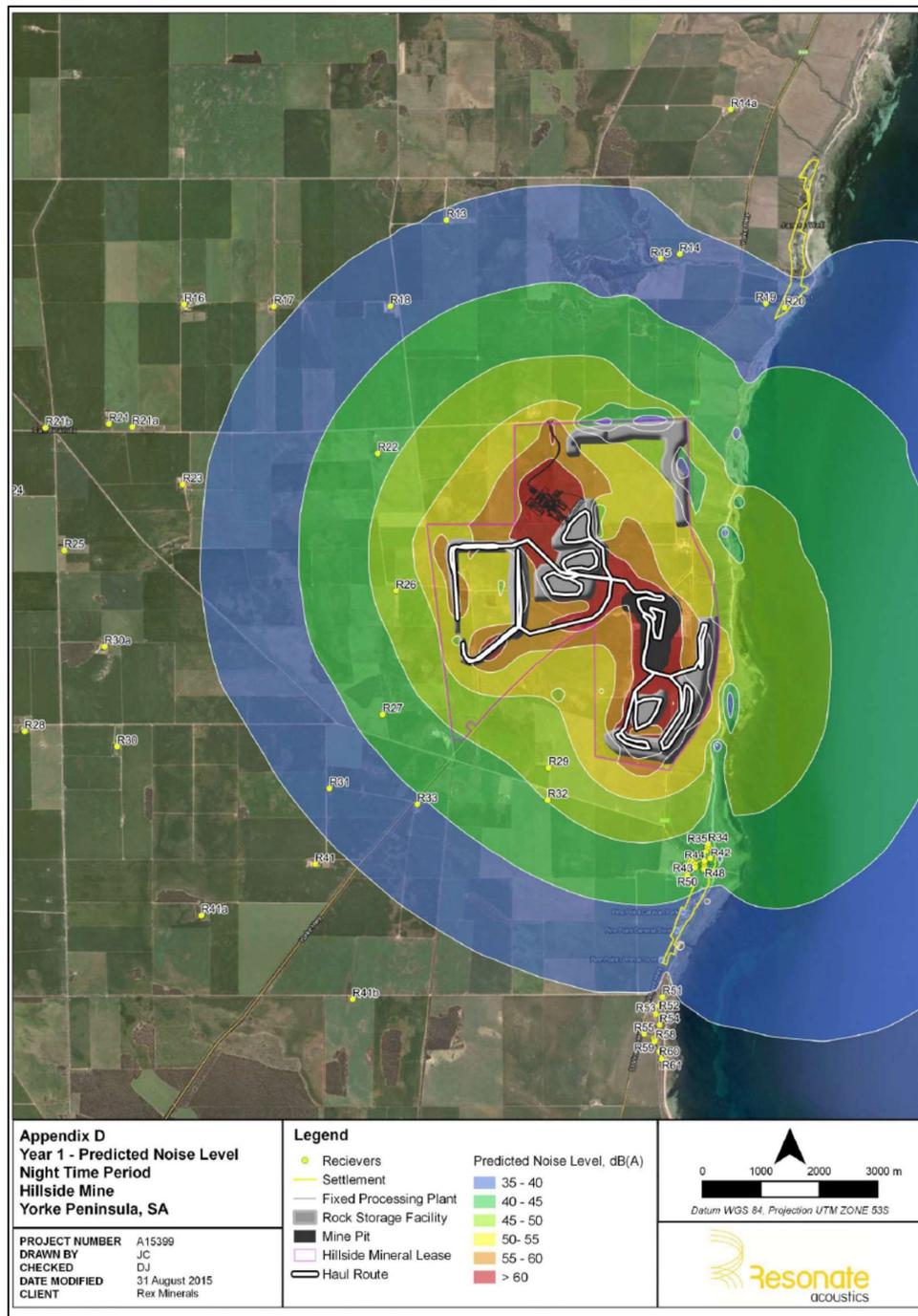


Figure 5: Year 1 Predicated Noise Level

Note: The blue shaded outermost area is equivalent to average background noise on local farmland.

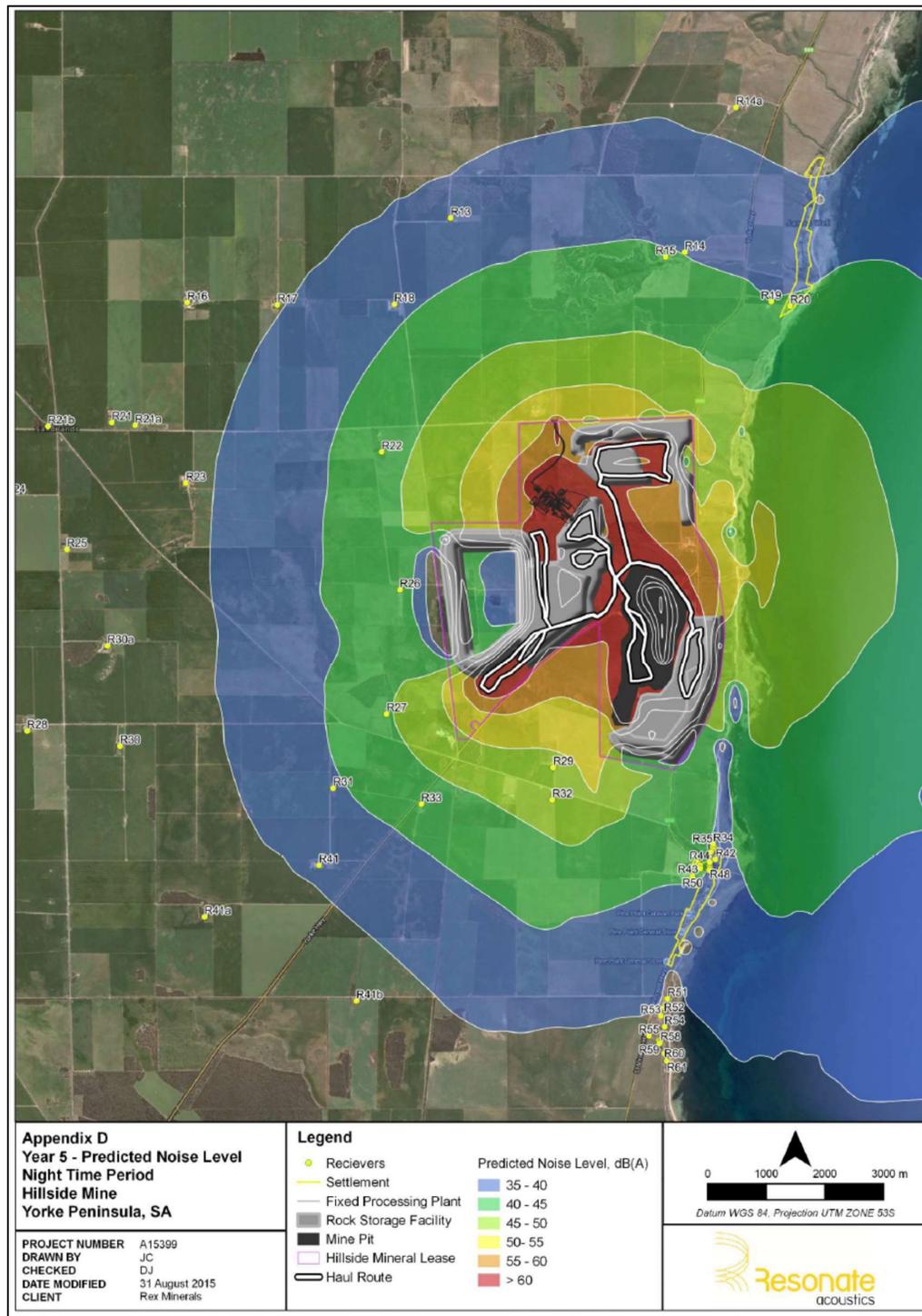


Figure 6: Year 5 Predicted Noise Level

Note: The blue shaded outermost area is equivalent to average background noise on local farmland.

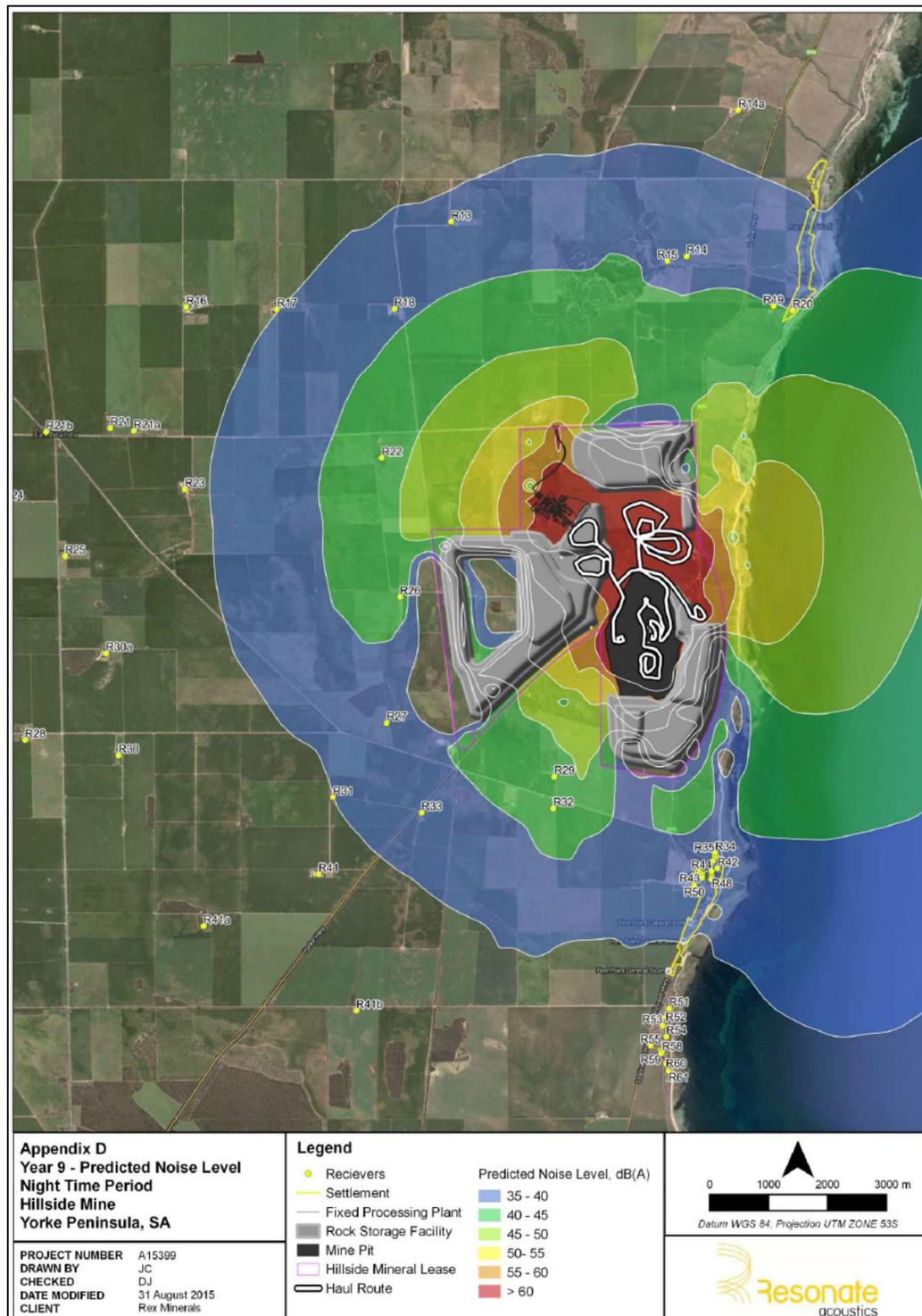


Figure 7: Year 9 Predicated Noise Level

Note: The blue shaded outermost area is equivalent to average background noise on local farmland.

Appendix 2: Correspondence Records

Attach key relevant communications with DSD, DPC, EPA and the community relating to this management plan.

Date	Communication with	Action or Outcomes
03/04/2017	HMCV	Introductory presentation on NMP and Monitoring Plan content.
16/05/2017	DSD	Outline by Rex Minerals of the NMP format and consultant assistance.
18/06/2017	Public Meeting	Public meeting held to present plan. Written public feedback from both DPC and public received as a result presentation and discussion.
02/10/2017	DPC & HMCV	Feedback summary of the NMP Version 3.0.
08/12/2017	DPC	Feedback from public meeting and DPC was addressed and where applicable incorporated into management plan. A Table of all feedback on each topic and how they were addressed is incorporated in the PEPR in Section 7.

Appendix 3: Noise Complaints Form Details - Example

Complaint received by.	
Date and time of complaint.	
The method by which the complaint was made (ie. verbal, telephone, written).	
Any personal details of the complainant which were provided by the complainant, or if no such details were provided, a note to that effect.	
The location of the nuisance observation.	
Wind speed and direction prior to, and at the time the complaint was received.	
Noise monitoring data at the time of the complaint and the period leading up to the complaint.	
The action taken by Rex Minerals in relation to the complaint, including any follow up contact with the complainant. Or If no action was taken, the reason(s) why no action was taken.	
Complaint and follow up correspondence reported as relevant.	

Appendix 4: Noise Related Lease Conditions Checklist

Noise related lease conditions and cross reference with NMP sections

Condition	Requirement	Section
Rex Minerals Hillside Mine Mineral Lease Conditions (ML 6438) Second Schedule		
Noise		
10	Subject to Condition 11, the Tenement Holder must ensure that noise generated from mining operations on the Land:	
10.1	Is measured, for or at, all sensitive receivers in accordance with the Environment Protection (Noise) Policy 2007, under the Environment Protection Act 1993 of South Australia; and	2, 10, 10.1, 10.3, 10.4, 10.5, Appendix 1
10.2	does not exceed the following noise limits, at those sensitive receivers:	
10.2.1	56 dB(A) between the hours of 7am and 10pm and 49 dB(A) between the hours of 10pm and 7am within a Primary Production Zone (as delineated in the Yorke Peninsula Council Development Plan at the date that the Mining Tenement was granted, set out in the Seventh Schedule of this Tenement Document); or	2, 7, 10, 10.1, 10.3, 10.4, 10.5, Appendix 1
10.2.2	54 dB(A) between the hours of 7am and 10pm and 47 dB(A) between the hours of 10pm and 7am within a Settlement Zone (as delineated in the Yorke Peninsula Council Development Plan at the date that the Mining Tenement was granted, set out in the Seventh Schedule of this Tenement Document).	
11	The Tenement Holder can only exceed the noise levels stipulated in Condition 10 if the Director of Mines:	
11.1	Is satisfied, on the basis of information provided to him by an acoustic engineer, that the noise from the mining operation will not cause an adverse impact at the sensitive receiver due to the existing influence of ambient noise, or the limited duration and/or frequency of occurrence of the activity, and	2, 4, 5, 10, 14
11.2	provides prior approval for the exceedance.	
12	The Tenement Holder must monitor noise levels on a continuous basis and report that data and meteorological monitoring data acquired by the Tenement Holder in real time to the public on an unrestricted internet site. The monitoring data must be retained and remain accessible on the unrestricted internet site for the life of the mine.	2, 10, 11
13	In the event that monitoring shows that Condition 10, subject to Condition 11, has been breached, the Tenement Holder must immediately cease the activity that resulted in the breach.	2, 9, 10, 12
Meteorological Monitoring		
14	The Tenement Holder must undertake meteorological monitoring in accordance with relevant Australian standards to measure and record meteorological data including (but not limited to) wind speed and direction, temperature, humidity, atmospheric pressure, solar radiation, rainfall and evaporation.	2, 7.1, 10.6
Rex Minerals Hillside Mine Miscellaneous Purposes Licence Conditions (MPL 146) Second Schedule		

Condition	Requirement	Section
There are no Hillside Mine MPL conditions (Second Schedule) relating to noise.		
Rex Minerals Hillside Extractive Mineral Lease Conditions (EML 6439) Second Schedule		
There are no Hillside Mine EML conditions (Second Schedule) relating to noise.		
Rex Minerals Hillside Mine Mineral Licence Conditions (ML 6438) Sixth Schedule		
Noise Outcome		
6	The Tenement Holder must, in construction and operation, ensure noise emanating from mining operations is in accordance with the current amenity as defined by the Yorke Peninsula Council Development Plan at the date that this Mineral Lease was granted.	3, 4, 7, 10, 12
Noise Strategies		
7	The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(c) of the Regulations in relation to the outcome in Sixth Schedule Clause 6:	
7.1	Ensure the strategies associated with the design, control and management of all noise sources mitigate, or eliminate noise characteristics as defined by the relevant environment protection noise policy.	3, 4, 5, 6, 7
7.2	At a minimum, implement all noise mitigation strategies described in the Proposal and Response Document.	3, 7, 8, 9
7.3	Investigate and implement further additional design and engineering measures or strategies to ensure achievement of the outcome in Sixth Schedule Clause 6, specifically in relation to the mitigation and elimination of noise characteristics as defined by the relevant environment protection noise policy.	3, 5, 7, 13, 14
7.4	The presence, or otherwise, of tonal/modulating/impulsive/low frequency noise characteristics must be verified by a suitably qualified independent acoustic engineer (approved by the Director of Mines) within 3 months of the commencement of earthworks, or at a time as the Director of Mines may specify by notice in writing. The acoustic engineer must prepare a report of the findings of the verification, and this report must be provided to the Director of Mines within 1 month of the completion of the verification.	3, 5, 10, 13
7.5	Undertake continuous noise and meteorological monitoring to inform decisions for operational response and contingency measures to be implemented to prevent exceedance of compliance criteria.	3, 10.3, 10.5
Noise Criteria		
8	The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(d) of the Regulations in relation to the outcome in Sixth Schedule Clause 6;	
8.1	criteria must include calculated noise limits as derived from the Environment Protection (Noise) Policy, and be consistent with Second Schedule Condition 10.	3, 10, 10.3, 10.4
8.2	Mine noise measured at, or for, noise-affected premises must be adjusted in accordance with the relevant environment protection noise policy by the inclusion of a penalty for each characteristic where tonal / modulating /	

Condition	Requirement	Section
	impulsive / low frequency characteristics are present as identified by an acoustic engineer.	
Rex Minerals Hillside Mine Miscellaneous Purposes Licence Conditions (MPL 146) Sixth Schedule		
There are no Hillside Mine MPL conditions (Sixth Schedule) relating to noise.		
Rex Minerals Hillside Mine Extractive Minerals Lease Conditions (EML 6439) Sixth Schedule		
Noise Outcome		
2.0	The Tenement Holder must, in construction and operation, ensure noise emanating from mining operations is in accordance with the current amenity as defined by the Yorke Peninsula Council Development Plan at the time of lease grant, set out in the Seventh Schedule of the Extractive Minerals Lease.	3, 4, 7, 10, 12
Noise Strategies		
3.0	The Tenement Holder is required to address the following matters for the purposes of Regulation 65(2)(c) of the Regulations in relation to the outcome in Sixth Schedule Clause 2 of the Extractive Minerals Lease:	3, 4, 7, 10, 12
3.1	The Tenement Holder must ensure that separation distances between any extractive stockpiles and Pine Point ensure the achievement of the outcome in Sixth Schedule Clause 2.	