FINGERBOARDS MINERAL SANDS PROJECT

Risk treatment plan:

Environmental noise

Kalbar update, 15 June 2021

Notes:

- Base document is Tabled Document 201a (centrifuge changes – clean version).
- Comments / references provided in square brackets [xxx] for context.

Risk treatment plan: Environmental noise

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1. Scope

This risk treatment plan is for the control of mining hazards associated with noise and vibration impacts. A 'mining hazard' means any mining activity that may pose a risk to the environment, to any member of the public or to land, property or infrastructure in the vicinity of work carried out within the Fingerboards mining licence area at any stage of project implementation (construction, operations, decommissioning and closure).

The noise controls described in this risk treatment plan apply to activities carried out within the Fingerboards mining licence area. Although some of the controls will also have the effect of limiting noise impacts of project-related activities beyond the mining lease (for example, transport of product by road), this plan does not specifically address noise or vibration generated outside the mining licence area. A Traffic Management Plan (*insert document number when EMS numbering system is established*) prepared as a requirement of the project's Planning Scheme Amendment and Incorporated Document describes how off-mine noise and/or vibration impacts from project vehicles will be managed.

This risk treatment plan does not address occupational vibration exposures or noise exposures regulated under the Victorian Occupational Health and Safety Regulations 2017. This risk treatment plan does not include controls to address vibration from mining activities, as baseline modelling for the Fingerboards project (Marshall Day, 2019) has concluded that even under worst case conditions vibration from the all sources within the mining licence area is expected to be well within applicable guidelines and standard criteria ranges, such that special control measures are not required.

2. Key sensitive receptors

Key sensitive receptors include any member of the public, especially occupants of nearby dwellings, that may be impacted or incommoded by noise or vibration arising from mining activities within the Fingerboards mining licence area (**Error! Reference source not found.**~~Table 1~~). Kalbar has identified 49 residential locations in proximity to the mining licence area as sensitive noise receptors (**Error! Reference source not found.**~~Table 2~~, **Error! Reference source not found.**~~Figure 1~~). The properties at locations R2 and R3 are owned by Kalbar and will not be occupied during construction or operations. The property at location R4 is being used by Kalbar as a mine site office.

Table 2-1: Key sensitive receptors - noise

#	Details of sensitive receptor	Location and proximity to site	How hazard may harm / damage receptor	Evidence to support assessment
1	Residential properties / accommodation near to mining licence area.	Refer Figure 1 and Table 2	Loss of amenity: exceedance of ~~EPA Publication 1411 Noise from Industry in Regional Victoria (NIRV) guideline values~~ noise limits prescribed under the Environment Protection Regulations 2021 by reference to the Noise Protocol (note that 'noise limit' is a defined term under the Regulations). Sleep disruption.	Marshall Day Acoustics, 2019. Fingerboards Mineral Sands: EES Noise and Vibration Assessment, report number 001 R07 20170182, 31 October 2019.

The *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*, EPA Publication 1826.4) (**Noise Protocol**), compliance with which is required by Part 5.3 (Noise) of the Environment Protection Regulations 2021, defines a 'noise sensitive area' as follows (rule 4 definitions):

"***noise sensitive area*** means—

(a) that part of the land within the boundary of a parcel of land that is—

(i) within 10 metres of the outside of the external walls of any of the following buildings—

(A) a dwelling (including a residential care facility but not including a caretaker's house);

(B) a residential building;

(C) a noise sensitive residential use; or

(ii) within 10 metres of the outside of the external walls of any dormitory, ward, bedroom or living room of one or more of the following buildings—

(A) a caretaker's house;

(B) a hospital;

(C) a hotel;

(D) a residential hotel;

(E) a motel;

(F) a specialist disability accommodation;

(G) a corrective institution;

(H) a tourist establishment;

(I) a retirement village;

(J) a residential village; or

(iii) within 10 metres of the outside of the external walls of a classroom or any room in which learning occurs in the following buildings (during their operating hours)—

(A) a child care centre;

(B) a kindergarten;

(C) a primary school;

(D) a secondary school; or

(b) subject to paragraph (c), in the case of a rural area only, that part of the land within the boundary of—

(i) a tourist establishment; or

(ii) a campground; or

(iii) a caravan park; or

(c) despite paragraph (b), in the case of a rural area only, where an outdoor entertainment event or outdoor entertainment venue is being operated, that part of the land within the boundary of the following are not noise sensitive areas for the purposes of that event or venue—

(i) a tourist establishment;

(ii) a campground;

(iii) a caravan park;"

Accordingly, it can be seen that statutory noise limits apply to various forms of accommodation (including camping) and education uses. The most noise affected receivers from the Project are all residential dwellings. Therefore,

whilst other types of receivers are considered 'noise sensitive' under the Regulations, compliance with noise limits at nearer receivers achieves compliance with noise limits at these more distant uses.

In addition to statutory noise limits set by the Regulations and Noise Protocol, Part 3 of the Environment Reference Standards made under s93 of the Environment Protection Act 2017 set indicators and objectives for various land use categories. In the case of the Project, Category IV applies to Farming Zone land and Category V applies to 'natural areas' such as Lympiars State Forest.

Table 3.3: Indicators and objectives for the ambient sound environment

Column 1 Land use category	Column 2 Indicators	Column 3 Objectives
Category I	Outdoor $L_{Aeq,8h}$ from 10 pm to 6 am	55 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 am to 10 pm	60 dB(A)
Category II	Outdoor $L_{Aeq,8h}$ from 10 pm to 6 am	50 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 am to 10 pm	55 dB(A)
Category III	Outdoor $L_{Aeq,8h}$ from 10 pm to 6 am	40 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 am to 10 pm	50 dB(A)
Category IV	Outdoor $L_{Aeq,8h}$ from 10 pm to 6 am	35 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 am to 10 pm	40 dB(A)
Category V	Qualitative	A sound quality that is conducive to human tranquillity and enjoyment having regard to the ambient natural soundscape

Figure ~~11~~ Extract from Environment Reference Standard

These objectives provide a context for this Project, although as the Preamble (clause 1) of the Environment Reference Standard states "This ERS is not a compliance standard. Its primary function is to provide an environmental Assessment and reporting benchmark."

In some circumstances, noise can adversely affect native fauna by interfering with communication, masking the sounds of predators and prey, and cause stress or avoidance reactions. However, the mining licence area and most nearby surrounding areas are characterised by an agricultural landscape that has been extensively cleared of native vegetation, which has reduced the amount of available habitat. Current land uses may affect native fauna through the use of farm machinery and traffic noise associated with roads. A detailed ecological investigation (EHP, 2019) has concluded that native fauna species in the project locality are likely to habituate to noise from mining activities and continue to use the areas adjoining the mining licence area for foraging, roosting and/or breeding. Accordingly, native fauna have not been included as sensitive receptors in this risk treatment plan. A separate risk treatment plan has been prepared to address potential project impact on flora and fauna (Fingerboards Draft Biodiversity Risk Treatment Plan.

Table 2-2: Sensitive receptor locations

Receptor	To project area (km)	To mining activity (km)	Description
R01	0.14	0.76	Residence
R02	0.16	0.18	Residence (owned by Kalbar)
R03	0.00	0.00	Residence (owned by Kalbar)
R04	0.00	0.12	Residence (owned by Kalbar)
R05	0.26	0.36	Residence
R06	0.58	0.84	Residence
R07	0.22	0.32	Residence
R08	1.70	1.94	Residence
R09	1.92	2.06	Residence
R15	0.27	0.53	Residence
R16	0.94	1.13	Residence
R17	1.08	2.04	Residence
R18	1.38	2.31	Residence
R19	1.89	1.92	Residence
R20	1.21	1.52	Residence
R21	0.95	1.11	Residence
R22	1.65	1.84	Residence
R25	1.39	1.64	Residence
R26	1.15	1.53	Residence
R27	1.66	1.93	Residence

Receptor	To project area (km)	To mining activity (km)	Description
R29	1.09	1.50	Residence
R30	0.33	0.35	Residence
R31	0.59	0.61	Residence
R35	1.36	1.65	Residence
R36	1.04	1.14	Residence
R38	1.94	2.12	Residence
R40	1.83	2.03	Residence
R41	1.34	1.55	Residence
R42	1.42	1.72	Residence
R43	1.51	1.66	Residence
R44	1.65	2.00	Residence
R45	1.65	2.08	Residence
R46	1.90	2.13	Residence
R47	0.33	0.35	Residence
R48	1.63	2.59	Residence
R49	1.85	1.92	Residence
R2001	1.85	1.95	Residence
R2002	1.91	2.02	Residence
R2003	1.83	2.22	Residence
R2004	0.05	0.30	Residence

R28	1.07	1.09	Residence				

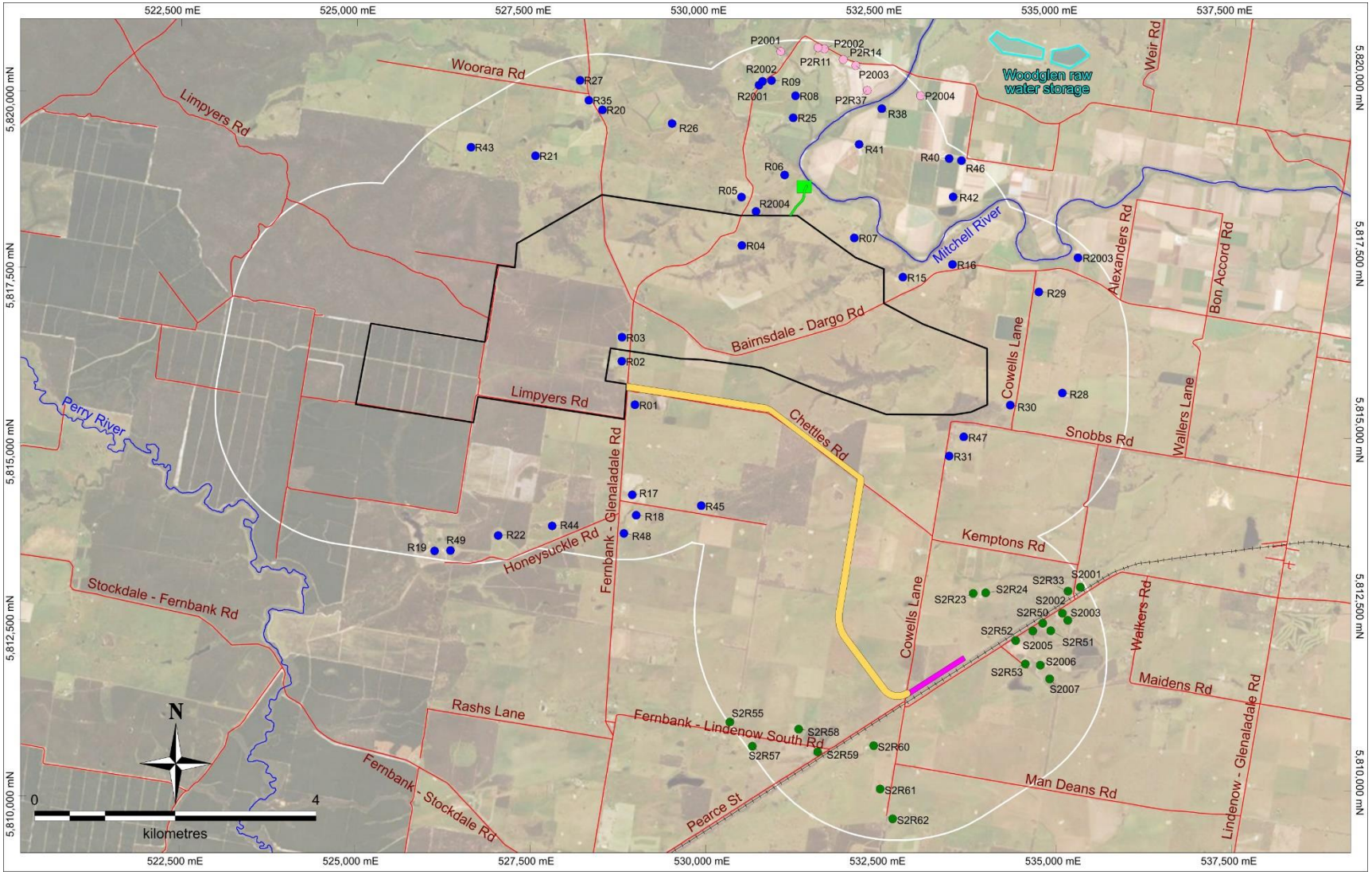

Figure 2.2~~21~~: Sensitive receptor locations (dwellings)

3. Inherent risk

In this risk treatment plan 'inherent risk' means the likelihood and consequence of a risk event, assuming that standard controls specified in Attachment A of the Fingerboards Risk Management Plan are implemented.

Table 3-1: Inherent risk ratings – environmental noise

#	Details of risk event	Phase	Consequence	Likelihood	Inherent risk rating
1	Noise levels at sensitive receptors exceed daytime or evening guideline values (Noise Protocol; Chapter 4 EPA Publication 1834, Civil construction, building and demolition guide) ~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV)~~	C	Moderate	Unlikely	Medium
2	Noise levels at sensitive receptors exceed night time guideline values (Noise Protocol; Chapter 4 EPA Publication 1834, Civil construction, building and demolition guide)~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV)~~	C	Moderate	Possible	Medium
3	Noise levels at sensitive receptors exceed daytime or evening guideline values (Noise Protocol; Chapter 4 EPA Publication 1834, Civil construction, building and demolition guide)~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV)~~	O, CL	Moderate	Unlikely	Medium
4	Noise levels at sensitive receptors exceed night time guideline values (Noise Protocol; Chapter 4 EPA Publication 1834, Civil construction, building and demolition guide)~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV)~~	O, CL	Moderate	Possible	Medium
5	Noise levels at sensitive premises cause sleep disruption and / or loss of amenity	C, O, CL	Moderate	Possible	Medium
6	Noise disrupts / displaces terrestrial fauna	C, O, CL	Insignificant	Possible	Low
7	Vibration causes structural damage to private or public property	C, O, CL	Insignificant	Rare	Low
8	Vibration adversely affects human comfort / amenity	C, O, CL	Minor	Unlikely	Low

Note: 'C' = construction; 'O' = operations; 'CL' = decommissioning and closure

4. Objectives

The objectives of this risk treatment plan are to minimise and manage project-related noise and vibration so as to:

- protect the health, wellbeing and amenity of residents and local communities
- protect the beneficial uses of the acoustic environment as defined in the ~~SEPP N-1~~Environmental Reference Standard.
- ensure compliance with noise limits specific in the Noise Protocol~~the NIRV guideline~~.

The controls described in this risk treatment plan aim to reduce noise generation from onsite activities and materials handling to the extent practicable.

5. Compliance standards

The main compliance standard for this risk treatment plan is the 'Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues' (EPA Publication 1826.4) (Noise Protocol),~~EPA Guideline 1411 – *Noise from Industry in Regional Victoria* (NIRV)~~.

Where particular noise hazards are not covered by the ~~NIRV guideline~~Noise Protocol (for example, noise from construction activities), guidance has been drawn from Chapter 4 of EPA Publication 1834, 'Civil construction, building and demolition guide' (Construction Guidelines).~~, other standards have been used, including:~~

- ~~State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) (SEPP N-1).~~
- ~~EPA Publication 480 - *Environmental Guidelines for Major Construction Sites*, 1996.~~
- ~~EPA Publication 1254 – *Noise Control Guidelines*, 2008.~~

6. Acceptance criteria

Acceptance criteria are the measures which, if attained, are the basis for concluding that the control measures described in this plan have been effective in achieving the plan objectives. Noise criteria specified in the ~~EPA *Guideline 1411 – Noise from Industry in Regional Victoria (NIRV)*~~Noise Protocol, which set mandatory statutory limits, have been used as the main standard for defining acceptance criteria for noise generated within the mining licence area during the operations phase of the project. The acceptance criteria for this noise risk treatment plan are summarised in Table 6-1~~Table 6-1~~

Table 6-1: Acceptance criteria – noise and vibration

Standard	Acceptance criteria
Construction and demolition (closure) phase	
EPA Publication 1834, *Civil construction, building and demolition guide*~~Noise Control Guidelines – EPA Publication 1254~~	• Day – Monday to Friday (7:00 a.m. to 6:00 p.m.) and Saturday (7:00 a.m. to 1:00 p.m.) there are no construction noise limits. • Evening – Monday to Friday (6:00 p.m. to 10:00 p.m.), Saturday (1:00 p.m. to 10:00 p.m.) and Sunday / Public Holidays (7:00 a.m. to 10:00 p.m.) noise limit is to be no greater than 10 dB above background noise and outside a residential dwelling for the first 18 months, and no greater than 5 dB above background noise and outside a residential dwelling after 18 months. • Night – Monday to Sunday (10:00 p.m. to 7:00 a.m.) noise must be inaudible inside a habitable room with windows open. Construction noise that is audible inside a habitable room of a residence is permissible in respect of 'unavoidable works' and 'low-noise or managed impact works'.
~~Noise Control Guidelines – EPA Publication 480~~	~~Night – Monday to Sunday (10:00 p.m. to 7:00 a.m.) noise should not be above the background sound inside any adjacent residence.~~ [note that this conflicts with the criteria provided in the Construction Guidelines, as above, so preferable to delete] •
Operations phase	
~~Noise from Industry in Regional Victoria – EPA Publication 1411~~Noise Protocol	• Day – 46 dB Leff (Monday to Friday (7:00 a.m. to 6:00 p.m.) and Saturday (7:00 a.m. to 1:00 p.m.)). • Evening – 41 dB Leff § (Monday to Friday (6:00 p.m. to 10:00 p.m.), Saturday (1:00 p.m. to 10:00 p.m.) and Sunday (7:00 a.m. to 10:00 p.m.)). • Night – 36 dB Leff (Monday to Sunday (10:00 p.m. to 7:00 a.m.)).

Notes: L_{eff} - Effective Noise Level. L_{eff} is the effective noise level of commercial or industrial noise determined in accordance with ~~SEPP (Control of Noise from Commerce, Industry and Trade)~~the Noise Protocol. L_{Aeq} – The equivalent continuous sound level, measured in dB, over the specified number of hours. This is commonly referred to as the A-weighted 'average noise level'.

7. Controls to address hazard [refer to updated Mitigation Register, below superseded]

Noise modelling for the construction phase of the Fingerboards project (Marshall Day, 2020) predicted that without proper mitigation, noise levels could exceed applicable noise criteria at some sensitive receptors within 1 km of the mining licence area boundary. Noise sources include both fixed and mobile noise sources. During operations, fixed noise sources include the wet concentrator plant, mining contractor's workshop, truck loading, pumps and associated booster equipment. Mobile noise sources include all mobile construction equipment and plant used during the operation of mining unit plants transport of product. The noise sources with the greatest potential to impact noise-sensitive receptors will be the mobile plant, including mobile equipment used for the mining unit plants, tailings management or transport of heavy mineral concentrate. Table 7-1~~Table 7-1~~ lists the noise mitigation controls that will be implemented to limit impacts on nearby sensitive uses.

Table 7-1: Environmental noise controls and associated performance measures

#	Details of controls	Performance measures
NV03	When pumping units over 500 kVA are located within 800 m of any dwelling, temporary acoustic barriers will be used. Earth bunds, Echobarrier or FlexShield barriers would be appropriate as long as the barrier height exceeds the pump height by at least 0.5 m. The barrier system will incorporate an acoustically-absorptive finish to minimise reflected noise and will have a sound insulating rating over Rw+Ctr 22.	Barrier design specifications and as-built records.
NV06*	Contingency procedures will be implemented if noise emissions during construction are observed to exceed those modelled for this EES. Contingency measures may include short term, temporary relocation for noise-affected occupants, when high noise levels from construction occur at night and there are no feasible ways of reducing noise levels or re-scheduling the activity.	Noise monitoring records; complaints records
NV09a	A noise risk management plan will be prepared and implemented for the management of impacts on sensitive receptors in proximity of the project area.	Implementation of this plan; construction and operations works schedules developed in consideration of noise acceptance criteria
NV09b	Kalbar will implement a complaints management procedure to address (among other matters) noise-related complaints.	Complaints records and incident follow up
NV10	Mobile plant items will be fitted with broadband reversing signals to avoid tonal characteristic associated with traditional reversing beepers.	Broadband alarms installed.
NV11	Activities such as overburden movement will be restricted to day and evening periods during Year 1 to avoid noise propagation during the night.	Mine schedule; haulage records
NV12	Screening measures through the construction of earth bunds at strategic locations to screen operational noise impacts upon sensitive receptors are an effective way to minimise noise impacts.	Construction records; noise monitoring records.

#	Details of controls	Performance measures
NV13	Direct treatment through plant noise-reduction kits will be undertaken on mobile equipment over a tare weight of 35 tonnes. Suitable noise-reduction kits have been identified for specific items of plant in consultation with industry specialists (Hushpak and Minetek) and Kalbar. They are listed in Section 10.2.1 of the Noise and Vibration report supporting the EES.	Installation and maintenance records: noise reduction fittings installed; noise monitoring records at commissioning.
NV14	The WCP will be cladded on the sides closest to sensitive receptors. The cladding will comprise 0.6 mm thick sheet steel with a lining of 75 mm thick, 32 kg/m2 glasswool insulation, which is expected to provide a sound insulation rating of Rw 31. The cladding will be applied to manage noise from the pumps and spirals.	Design specification; as-built records; noise monitoring records at commissioning.
NV15*	Consultation with affected residents located in the vicinity of the site will be conducted during the course of the project to investigate any need for alternative or additional noise control measures depending on each individual situation (e.g., acoustic treatment for dwellings, temporary relocation).	Consultation records; complaints records; attended and unattended noise monitoring records; implementation of agreed contingency actions.
NV16	The quietest available plant and equipment will be selected for the project, where feasible.	Procurement specifications
NV17	Noisier activities will be scheduled for less sensitive times where feasible and works will be limited as much as practicable during the night and weekends.	Construction and operations works schedules developed in consideration of noise acceptance criteria
NV18	Residents at noise-sensitive receptors will be informed of the timing and location of each construction stage and associated noise reduction measures, and given notice and details of periods of noisy activities (such as excavation).	Records of communications with affected sensitive receptors
NV19	Operational practices will be implemented (such as 'push-back' mining operations) to optimise the direction of pit excavation so the terrain provides maximum natural attenuation of plant and equipment.	Mine plan and schedule
NV20	All personnel will be informed about the measures required to minimise noise including through regular toolbox talks.	Site inductions; toolbox talk records
NV22	All pneumatic tools used near residential areas will be fitted with an effective silencer on the air exhaust port.	Periodic inspections by site environmental officer; work instructions
NV23	Plant will be turned off when not in use.	Periodic inspections by site environmental officer; work instructions
NV24	All plant and equipment will be maintained in accordance with manufacturers' specifications.	Maintenance records

#	Details of controls	Performance measures
NV25	No truck associated with the work will be left standing with its engine operating for more than five minutes, where possible.	Work instructions
NV27	All project vehicles will be maintained in accordance with manufacturers' specifications.	Maintenance records
NV28	Trucks will be equipped with adequate and functioning mufflers.	Maintenance records
NV29	Project vehicles will be driven to the speed limit and in a careful manner, avoiding strong acceleration/deceleration	Site inductions; work instructions; speed limit signs in place
NV30	Activities which generate the highest potential noise and vibration will not be scheduled at night, where feasible	Construction and operations works schedules developed in consideration of noise acceptance criteria
NV31	A permanent power supply will be secured as early as possible to minimise the time diesel generators are used.	Records of engagement with power provider; practical completion of permanent power supply
NV32	Equipment and processes that do no exhibit characteristics of intermittency or impulsiveness will be selected, where feasible.	Procurement specifications
SE22	Timely responses will be provided to any community complaints raised	Complaints records and incident reports / follow up records
SE26	A community complaints procedure will be developed and implemented.	Procedure in plan and publicly available

Note: An asterisk (*) indicates an additional mitigation measure proposed to lower the risk of impact beyond what could be achieved using only standard mitigation measures.

Table 7-2: Additional Controls identified in the EES process.

#	Details of controls	Performance measures
1	The centrifuge plant has been modelled without the benefit of the noise reduction associated with the proposed enclosure for the plant. The design would need to be developed in further detail to provide a reliable basis for modelling the effect of the enclosure (to account for building configuration, material selections, and envelope penetrations). However, a basic lightweight enclosure with acoustically designed penetrations would reduce the noise of the centrifuge plant by at least 5 dB, and alternative material selections including demountable insulation panels would readily enable enclosure reductions of at least 15 dB. This will be addressed during detailed design. Detailed design will consider the requirement to reduce noise emissions including cladding and enclosures.	Detailed design that meets noise criteria through better modelling assumptions
2	Irrespective, if the centrifuge-based option is developed, all aspects of the centrifuge plant, including the building design, associated ancillary equipment and associated haul route changes, would need to be represented in the design stage noise modelling. Consistent with the wider approach to addressing noise from the site, this design stage modelling would inform: The specification and tendering of equipment to meet the noise requirements The development of the noise mitigation and management measures will be incorporated into this Environmental Noise Management Plan.	Updated noise risk treatment plan to incorporate detailed design elements of the project.
3		

8. Residual risk assessment

The risk ratings for events contributing to environmental noise hazards – once standard and additional mitigation actions have been put in place – are summarised in Table 8 1.

Table 8-1: Residual risk ratings – environmental noise

#	Details of risk event monitored	Phase	Consequence	Likelihood	Residual risk rating
1	Noise levels at sensitive receptors exceed daytime or evening guideline values (~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV))~~Noise Protocol; Construction Guidelines)	C	Unlikely	Minor	Low
2	Noise levels at sensitive receptors exceed night time guideline values (Noise Protocol; Construction Guidelines)~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV))~~	C	Unlikely	Moderate	Medium
3	Noise levels at sensitive receptors exceed daytime or evening guideline values (Noise Protocol; Construction Guidelines)~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV))~~	O, CL	Unlikely	Minor	Low
4	Noise levels at sensitive receptors exceed night time guideline values (Noise Protocol; Construction Guidelines)~~EPA Publication 1254 Noise Control Guidelines; Noise from Industry in Regional Victoria (NIRV))~~	O, CL	Unlikely	Moderate	Medium
5	Noise levels at sensitive premises cause sleep disruption and / or loss of amenity	C, O, CL	Unlikely	Moderate	Medium
6	Noise disrupts / displaces terrestrial fauna	C, O, CL	Possible	Insignificant	Low
7	Vibration causes structural damage to private or public property	C, O, CL	Insignificant	Rare	Low
8	Vibration adversely affects human comfort / amenity	C, O, CL	Unlikely	Unlikely	Low

Note: 'C' = construction; 'O' = operations; 'CL' = decommissioning and closure

9. Monitoring

Monitoring required to check the effectiveness of noise controls is summarised in Table 9-1~~Table 9-1~~.

Table 9-1: Proposed monitoring for environmental noise

#	Aspect to be monitored	Details of monitoring
1	Noise emissions testing (targeted commissioning checks of fixed and mobile plant)	Noise testing of selected fixed and mobile equipment at commissioning / start of construction to confirm that actual plant noise levels conform to design specifications and are in line with the noise data that were input in the noise model and to check whether operations can be implemented in a way that is consistent ~~NIRV recommended noise levels~~Noise Protocol noise limits.
2	Noise emissions testing (targeted follow up checks of fixed and mobile plant)	Annual noise testing of selected fixed and mobile equipment at to check that actual noise emissions levels conform to design specifications and are in line with the noise data that were input in the noise model.
3	Ambient noise – attended monitoring (project commencement)	Attended monitoring of ambient noise ~~on at least 3 occasions~~ during ~~the first 14 days of~~ construction phase of the project. Measurements would be undertaken during day, evening and night periods to determine the noise level due to site construction activity at the worst-affected noise-sensitive receivers. [specifying 3 days too specific and also likely to be insufficient – plus does not account for deployment of continuous remote noise monitoring equipment which will often be in place for 14 days or more] [limitation to 'first 14 days' insufficient. Monitoring will need to be tailored to construction schedule and when impacts may arise]
4	Ambient noise – attended monitoring (construction surveillance)	Follow up attended noise monitoring – at least 2 monthly during the construction phase of the project with additional measurement campaigns which are fit for purpose. Measurements would be undertaken during day, evening and night periods to determine the noise level due to site construction activity at the worst-affected noise-sensitive receivers.
5	Ambient noise – attended monitoring (mining operations)	Follow up attended noise monitoring as necessary to demonstrate compliance with noise limits based on worst case operations ~~– at least annually during active mining.~~ [yearly measurements is too simplistic. Needs to be targeted and likely more frequent than once yearly]
6	Ambient noise – unattended monitoring (project commencement)	7-day unattended surveys conducted ~~at 6 locations~~ during the first three months following commencement of ~~construction~~ operation (one survey per month during each of first three months or additional measurements as needed to properly assess compliance). Measurements would be undertaken during day, evening and night periods to determine the noise level due to site construction activity at the worst-affected noise-sensitive receivers.

#	Aspect to be monitored	Details of monitoring
7	Ambient noise – unattended monitoring (ongoing monitoring).	7-day surveys conducted quarterly ~~at 6 locations~~ following commencement of mining (one survey per quarter or additional measurements as needed to properly assess compliance). Measurements would be undertaken during day, evening and night periods to determine the noise level due to site construction activity at the worst-affected noise-sensitive receivers.
8	Complaints	Continuous monitoring, assessment of and response to ~~of~~ complaints in accordance with Fingerboards Complaints Procedure. If a noise complaint occurs outside of scheduled noise monitoring periods, the noise complaint would be investigated by reviewing the record of site activities. If noise from site activity is confirmed to be the cause of the complaint, and if the site activity records are not sufficient to determine the reason for the noise, further noise monitoring may be undertaken outside the scheduled noise monitoring periods.
9	Meteorological conditions	Continuous monitoring of temperature, humidity, wind speed and direction, barometric pressure, precipitation.

10. Reporting

Table 10-1: Noise performance and compliance reporting

#	Aspect being reported	To whom will the information be reported? At what frequency?	How will the information be used?
1	Noise emissions testing (targeted commissioning checks of fixed and mobile plant).	Event based-reporting to environmental superintendent; non-conformance reporting to contracts manager.	To review and update predict noise modelling; as basis for acceptance of plant and equipment; to inform procurement practices.
2	Noise emissions testing (targeted follow up checks of fixed and mobile plant)	Event based-reporting to environmental superintendent; non-conformance reporting to contracts manager.	To review and update predictive noise modelling; as basis for acceptance of plant and equipment; to inform procurement and maintenance practices.
3	Ambient noise – attended monitoring (project commencement)	Event based-reporting to environmental superintendent and construction manager.	To check effectiveness of personnel inductions, complaints management procedure; to check compliance with ~~EPA Publications 480 and 1254~~Construction Guidelines.
4	Ambient noise – attended monitoring (construction surveillance)	Monthly reporting to Fingerboards management team; quarterly reporting to Community Reference Group; annual environmental compliance reporting to ERR, EPA and EGSC.	To check compliance with ~~EPA Publications 480 and 1254~~Construction Guidelines; input to contractor performance assessment.
5	Ambient noise – attended monitoring (mining operations)	Monthly reporting to Fingerboards management team; quarterly reporting to Community Reference Group; annual environmental compliance reporting to ERR, EPA and EGSC.	To demonstrate compliance with ~~NIRV~~the Noise Protocol; input to review and update predictive noise modelling; input to updates of this risk treatment plan; to inform mine planning and maintenance schedules.
6	Ambient noise – unattended monitoring (project commencement)	Monthly reporting to Fingerboards management team; quarterly reporting to Community Reference Group; annual environmental compliance reporting to ERR, EPA and EGSC.	To check compliance with ~~EPA Publications 480 and 1254~~Construction Guidelines; input to contractor performance assessment.
7	Ambient noise – unattended monitoring (ongoing monitoring).	Monthly reporting to Fingerboards management team; quarterly reporting to Community Reference Group; annual environmental compliance reporting to ERR, EPA and EGSC.	To demonstrate compliance with ~~NIRV~~the Noise Protocol; input to updates of this risk treatment plan; input to review and update predictive noise modelling; to inform mine planning and maintenance schedules.

#	Aspect being reported	To whom will the information be reported? At what frequency?	How will the information be used?
8	Complaints	Weekly reporting to Fingerboards management team; complaints statistics reported quarterly to Community Reference Group; annual reporting to ERR and EPA.	To check effectiveness of noise control; to inform ongoing mine planning, maintenance and monitoring strategies
9	Meteorological conditions	Daily reporting to environmental superintendent; event-based reporting to management team in the event of complaints or non-compliance events.	To inform incident investigations; input to predictive noise modelling.

11. References

Ecology and Heritage Partners, 2019. Detailed Ecological Investigations for the proposed Fingerboards Mineral Sands Project, Glenaladale, Victoria, September 2019.

~~EPA Victoria, 1996. EPA Publication 480 - *Environmental Guidelines for Major Construction Sites.*~~

~~EPA Victoria, 2008. EPA Publication 1254 - *Noise Control Guidelines*.~~

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12. Kalbar reference documents

[To be completed when EMS is fully developed]

Table 12-1: Kalbar reference documents

#	Document
1	
2	
3	