



APPENDIX V - NOISE AND VIBRATION ASSESSMENT

Isaac Downs Extension

Noise and Vibration Impact Assessment

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Author	Alex Vuillemin	Principal Acoustic Engineer		22/01/2026
Reviewer / Approver	Monica Saralertsophon	Principal Acoustic Engineer		22/01/2026

Terms and Abbreviations

Abbreviation	Definition of term
A-weighting	A standard electronic weighting network within a sound level meter, designed to approximate the loudness response of the average human ear to sounds of different frequencies at moderate sound pressure levels.
Ambient noise level	The totally encompassing sound in a given situation at a given time, composed of sound from all sources near and far, measured by the totally encompassing time average A-weighted sound pressure level in a given situation at a given time.
dB / dB(A)	Decibel / A-weighted decibel. A frequency-weighted noise unit that corresponds to the A-weighted response of the human ear and generally correlates with loudness.
Facade affected	A monitoring location which is influenced by facade reflections. Measurements at facades are typically taken at a distance of 1 m away and the measured noise level taken as +2.5 dB higher than 'free field'.
Free field	A monitoring location where the microphone is positioned sufficiently far from nearby surfaces for the measured data to not be influenced by reflected noise.
L_{90} , L_{10} , etc.	Statistical exceedance levels, where L_N is the sound pressure level exceeded for N% of a given measurement period.
L_{AE} (or SEL)	Sound Exposure Level. This is the constant sound pressure level that has the same amount of energy in one second as the original noise event.
$L_{Aeq,T}$	The A-weighted equivalent noise level over a time interval (T). It is defined as the steady sound pressure level that contains the same amount of acoustical energy as the corresponding time-varying sound.
$L_{Amax,T}$	The A' weighted maximum sound pressure level of an event over a time interval (T).
Low frequency	Noise containing energy in the low frequency range from 20 Hz to 200 Hz: A unit of frequency equal to one cycle per second.
L_P (or SPL)	Sound Pressure Level
L_W (or SWL)	Sound Power Level
Noise logger	A self-contained, battery powered item of equipment that is used to measure noise levels over several days.
Octave-band	A frequency band where the highest frequency is twice the lowest frequency.
Rating background level (RBL)	The overall single-figure background level representing each assessment period (for example; Standard hours, Non-Standard hours, etc.). RBLs are derived from the noise monitoring results and correspond to the median of the 90th percentile of the background (L_{A90}) noise levels for each daytime, evening and night period. The recommended RBLs for each of the noise sensitive receptors are based on the dominant land use of each site.
R_w	Weighted Sound Reduction Index of a building element. That is, the laboratory tested (or theoretically calculated) sound insulation performance of a single element.
Sound insulation	A reference to the degree of acoustical separation between any two areas or building elements.
Steady state noise	Noise which remains relatively constant in level over time, as opposed to time-varying noise which fluctuates over time.
Time weighting	Sound level meters can be set to 'fast' or 'slow' response. 'Fast' corresponds to a 125 ms time constant and 'Slow' corresponds to a 1 second time constant.
Sensitive receptors	Noise and vibration sensitive receptors are locations/areas where there is potential for human perception or structural damage from the proposed works.

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Executive Summary

Stanmore ID Extension Pty Ltd (ID Extension, the proponent), a wholly owned subsidiary of Stanmore resources Ltd (Stanmore), proposes to develop the Isaac Downs Extension (IDE) Project (the Project), which will extend the life of mining operations at the Isaac Plains Complex through the development of a new open cut coal mine pit. The Project will be integrated into the Isaac Plains Complex (IPC) with run of mine coal washed at the adjacent Isaac Plains Mine (IPM) coal handling and preparation plant, shared mine infrastructure area at IDM, and connecting infrastructure such as water management infrastructure and power supply.

The proponent intends to commence construction activities in late 2027 / early 2028, subject to obtaining all required approvals, with mining operations commencing in 2028 and coal extraction in 2029. The last year of operation is expected to be 2043.

The terms of reference (ToR) for an environmental impact statement under the *Environmental Protection Act 1994* (EP Act) were issued by the Queensland Government on the 11th December 2025. A noise and vibration impact assessment is required to demonstrate that the Project can meet the relevant environmental objectives and performance outcomes under the EP Act and the ToR.

The Project is located approximately 15 km southeast of Moranbah. It is largely located on Winchester Downs station (Lot 8 SP277834) and has overlaps with a State Reserve (Lot 9 GV33) which has grazing rights for the owners of Winchester Downs, a local road used to access Winchester Downs, the Isaac River and Cherwell Creek. There is a single sensitive receptor (Winchester Downs homestead) within approximately 1.2 km of the proposed mining activities. Other sensitive receptors are located within approximately 10 km.

Ambient noise monitoring was conducted at Winchester Downs homestead in July 2025 and rating background noise levels were determined to be lower than 25 dB(A).

Project specific noise and vibration criteria, including airborne noise, low frequency noise, blasting noise and blasting vibration and were derived from the relevant act, regulation, policy and guideline issued by the Queensland Government. These are summarised as follows.

Residence	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
Airborne noise (outdoors)	L _{Aeq,adj,1hr} 35 dB(A)	L _{Aeq,adj,1hr} 35 dB(A)	L _{Aeq,adj,1hr} 30 dB(A)
	L _{Zeq,adj,1hr} 57 dB(Linear)	L _{Zeq,adj,1hr} 57 dB(Linear)	L _{Zeq,adj,1hr} 57 dB(Linear)
Airblast overpressure	115 dB(Linear) peak for 9 out of 10 consecutive blasts 120 dB(Linear) peak at any time	No blasting	No blasting
Ground-borne vibration	5 mm/s peak particle velocity for 9 out of 10 consecutive 10 mm/s peak particle velocity at any time	No blasting	No blasting

A 3D noise model was developed using SoundPLAN v8.2, and 3 different years of operation as outline below. All scenarios were modelled under neutral and adverse weather conditions.

- Year 2029: opening year, with in-pit excavation, waste route and waste stockpile in the south of the Project area
- Year 2034: peak coal production and peak waste production year, waste route and waste stockpile in the south of the Project area, in-pit excavation to the north of the Project area
- Year 2042: final full year of operation, with production ramping down.

Exceedances of the airborne noise criteria of 4 dB(A) to 10 dB(A) are predicted during the night period at the nearest receptor (R1) Winchester Downs homestead for all nominated scenarios under adverse weather conditions. Under neutral conditions, exceedances of up to 4 dB(A) are predicted during the night period at the nearest receptor (R1) for years 2029 and 2034. Operations are predicted to comply during the day and evening periods for the proposed operations.

Predicted levels show compliance with the low frequency noise screening criterion at the nearest receptor (R1) and therefore, at all receptors. In addition, as the modelled scenarios reflect the highest potential noise impacts, any emissions arising from construction or closure stages are considered to fall within the bounds of the worst-case operational assessment.

Review of the dominant noise sources predicted at the Winchester Downs homestead indicates that waste-related activities, including haulage, dozer operations (on the dump and in-pit), and excavator use, are the primary contributors to the predicted noise environment.

Potential noise mitigation measures were reviewed in collaboration with the proponent, including the sources (equipment and operations), the path (shielding) and at the receptor, as follows:

- A review of the noise mitigation solutions developed by mining equipment specialists, dozers, excavators and trucks manufacturers as well as a review of alternative equipment indicated that noise reductions up to 4 dB(A) for the equipment under investigation may be considered for bespoke silencer kits.
- Constructing noise bunds, altering operational hours and re-routing equipment were not found to be operationally or economically effective.

The proponent proposes to enter into an alternative arrangement with the owner of the Winchester Downs homestead for amenity impacts, which could include property modifications, resulting in reductions of up to 10 dB(A) inside homestead buildings.

A review of the nearest sensitive receptors and their locations relative to the surrounding mines indicated that only the nearest receptor, Winchester Downs, would potentially be subject to cumulative noise impacts with the Project. The noise levels emitted by other mines at the Winchester Downs homestead are noted to range between 22 dB(A) to 31 dB(A), while the Project is predicted up to 40 dB(A). At this receptor, the Project emission is considered the primary contributor.

The open cut mining methods for the Project include drilling and blasting of pre-strip overburden, overburden, and pit floor for geotechnical stability, allowing for in-pit dumping. Industry best practices will also be applied through the blast design and execution processes to achieve compliance with the Project's airblast overpressure and ground vibration criteria. As required, airblast overpressure and ground vibration monitoring will be conducted during the Project's mining operations to demonstrate compliance, to assist blast management, and if required, to manage blasting complaints.

1 Project overview

1.1 Purpose of the Project

Stanmore ID Extension Pty Ltd (ID Extension), a wholly owned subsidiary of Stanmore Resources Ltd (Stanmore), proposes to develop the Isaac Downs Extension (IDE) Project (the Project).

The Project is located in the Bowen Basin of central Queensland approximately 15 km southeast of Moranbah and 150 km southwest of Mackay (refer to Figure 1), with the Project's mining lease application areas shown in Figure 2.

The Project will extend the life of mining operations at the Isaac Plains Complex (IPC) through the development of an open cut coal mine pit and associated infrastructure. IPC comprises Isaac Downs Mine (IDM), Isaac Plains Mine (IPM) and the Project, operated by wholly owned subsidiaries of Stanmore (refer to Figure 2).

The Project adjoins IDM and will be integrated into IPC with run of mine (ROM) coal washed at the IPM coal handling and preparation plant (CHPP), shared mine infrastructure area at IDM, and connecting infrastructure such as water management infrastructure and power supply.

Mining of ROM coal at IDM is expected to ramp down between 2026 and 2028, with Project construction commencing late 2027 / early 2028 and ROM coal extraction in 2029. The IPC workforce will transition to IDE as mining ramps down at IDM and ramps up at IDE. The Project, being an extension of mining activities at IPC, is therefore important to ensure a near steady state workforce across IPC beyond 2027 and 2028.

1.2 Project description

The Project activities comprise an open cut coal mine pit and associated infrastructure, primarily mining metallurgical (steel making) coal. Approximately 46 Mt of ROM coal will be mined over 15 years, with approximately 2 – 4.5 Mt per annum. The proponent intends to commence construction activities in late 2027 / early 2028, subject to obtaining all required approvals, with mining operations commencing in 2028 and ROM coal extraction in 2029.

The open cut mining methods for the Project will be similar to those at IDM, including:

- clearing of vegetation, stripping and stockpiling of topsoil
- drilling and blasting of pre-strip overburden
- removing the pre-strip overburden using mining equipment at IDM, being a dragline and / or truck and shovel fleets and / or dozers
- drilling and blasting of overburden
- drilling and blasting of pit floor for geotechnical stability to allow for in-pit dumping
- overburden removal using the existing dragline at IDM and / or truck and shovel fleets
- coal mining using excavators
- formation of out of pit and in-pit overburden dumps as mining progresses
- progressive rehabilitation of overburden dump areas.

ROM coal will be transported from the Project's ROM coal pad to the CHPP at IPM for washing, utilising existing haul roads at IPC and new haul roads, including a bridge across the Isaac River, constructed in the Project area. The dragline will be walked from IDM to the Project via a temporary crossing of the Isaac River.

A satellite go line and crib area will be constructed at the Project, with the existing mine infrastructure area at IDM continuing to service Project activities.

The primary access to the Project for workers and deliveries will be via the existing access road at IDM and new access roads connecting with the Project, utilising the bridge to be constructed across the Isaac River. There is potential for a secondary access route to the Project between the Project and Stanmore's Eagle Downs project, utilising new and existing roads to connect with the Peak Downs Mine Road.

Topsoil stockpile areas will be used for storage of topsoil that has been stripped from mining and infrastructure areas, for future use in rehabilitation.

Power for the dragline will be supplied to the Project via powerline connections with existing power supply at IDM. The Project may require additional linear infrastructure at IDM to facilitate the extension of mining activities to the Project, however this will be within areas authorised for disturbance.

The Project operational workforce will be similar to, but lower than that for current operations at IPC, with around 300 - 400 workers, compared to around 400 - 450 workers. Approximately 100 – 150 workers will be engaged at the Project for infrastructure construction. The Project, being an extension of mining activities at IPC, is therefore important to ensure a near steady state workforce across IPC beyond 2027 and 2028.

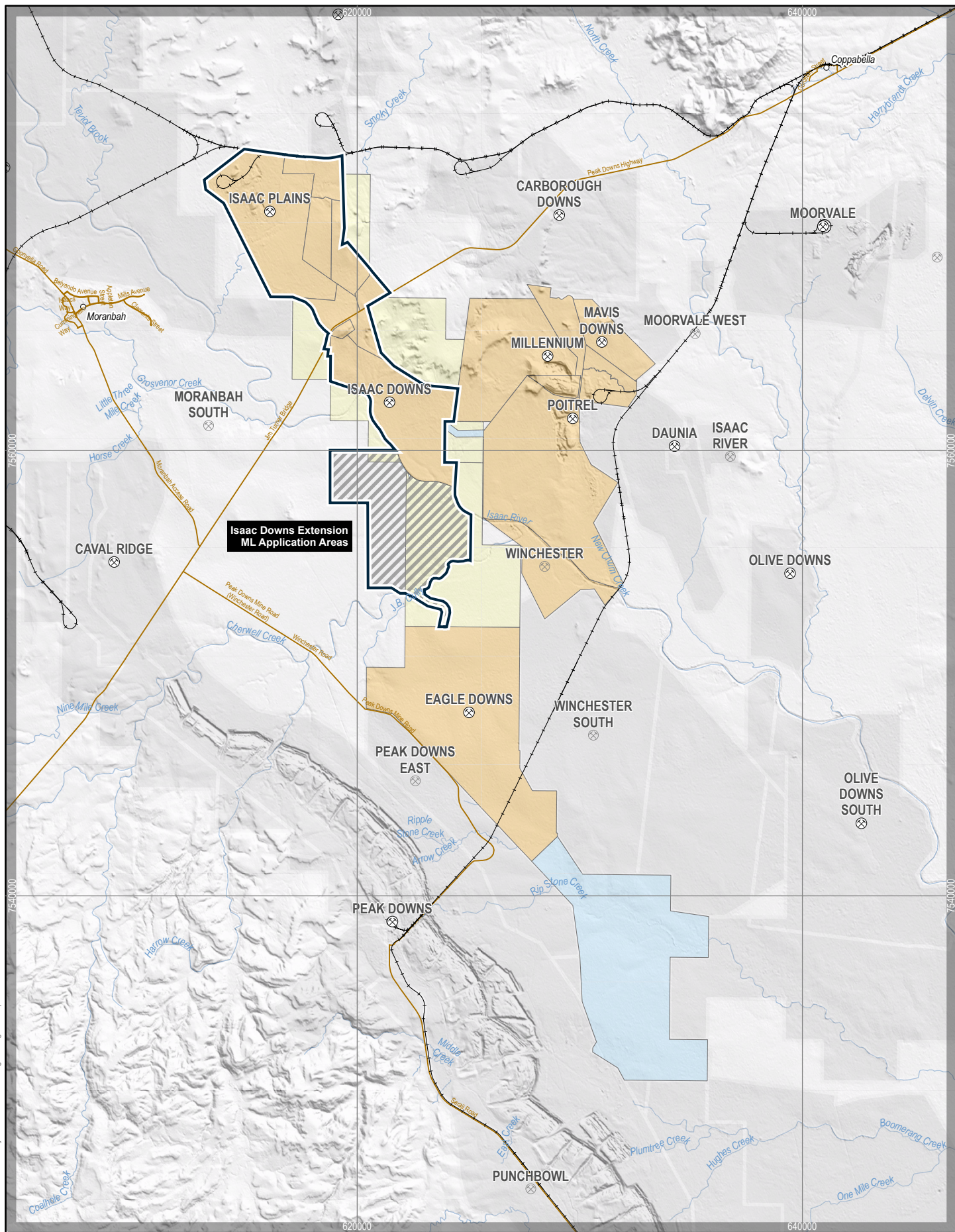
Workforce accommodation arrangements will continue in a similar manner to those for the current IPC workforce, being a mix of residences in Moranbah and other local or regional towns, and mine accommodation villages in the region. Through the Project, Stanmore will continue to support local and regional suppliers and contractors, providing additional economic benefits and employment in the region.

The Project is not proposing any novel or unproven resource extraction process, technology or activity.

1.3 Purpose of this report

This report provides a noise and vibration impact assessment to support the environmental impact statement for the Project. It addresses the following:

- description of the existing noise environment in the vicinity of the Project area
- identification of the existing noise sensitive receptors in the vicinity of the Project area
- description of the relevant noise and vibration criteria
- modelling of noise and vibration emissions associated with the operation and construction of the Project
- assessment of the noise and vibration emissions against the relevant noise and vibration criteria
- description of the relevant noise mitigation measures to be implemented.





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 Kilometres

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LEGEND

 Mining Lease

 Populated Places

 Waterway

 Roads

 Rail

 Isaac Plains Complex

 Isaac Downs Extension ML Application Areas

 Stanmore Resources Ltd Subsidiary Tenements

 Mining Lease

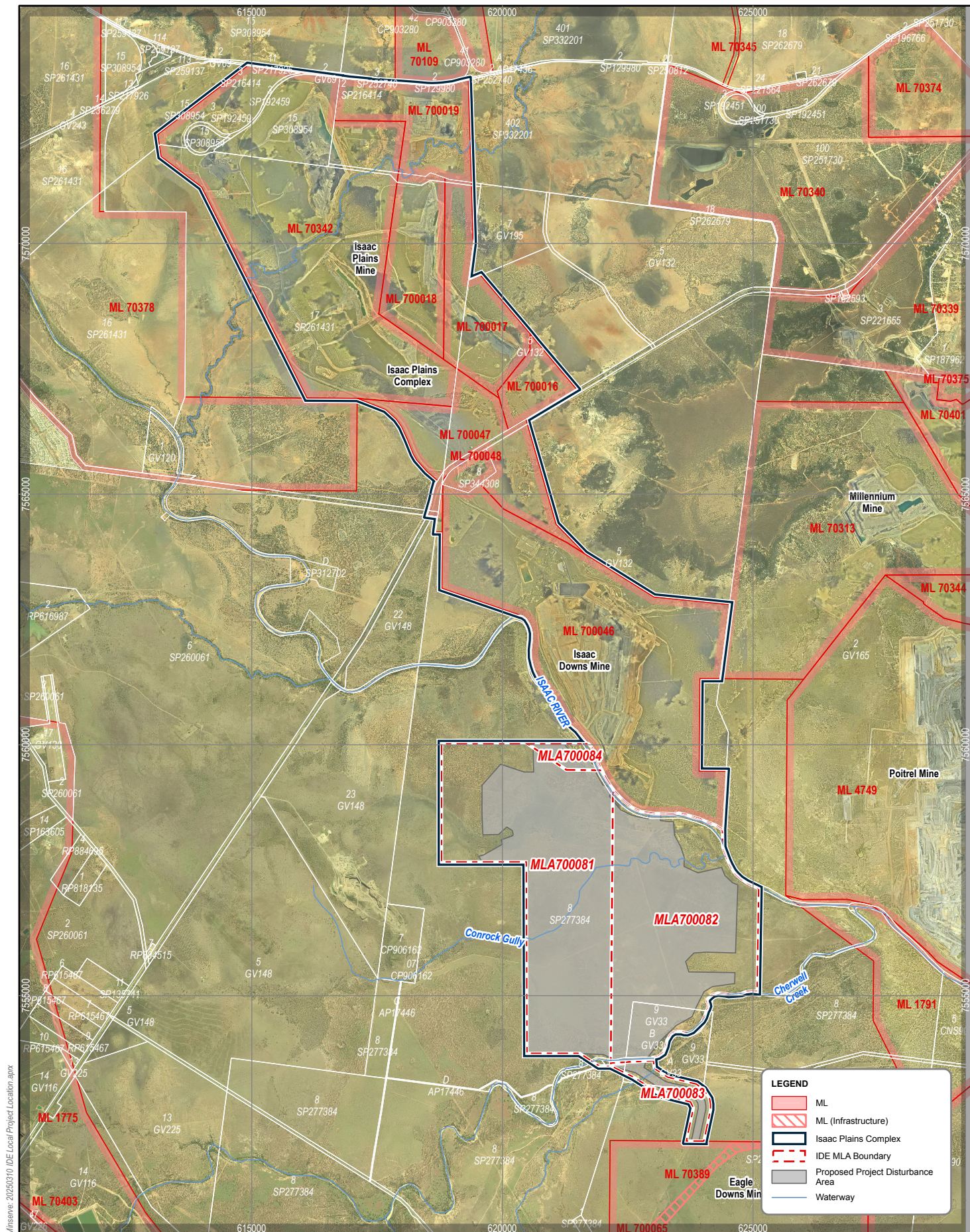
 Mineral Development Licence

 Exploration Permit Coal

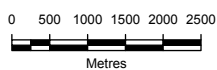


ISAAC DOWNS EXTENSION

Project Location



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Local Project Location

1.4 Terms of reference

The terms of reference (ToR) for an environmental impact statement (EIS) under the *Environmental Protection Act 1994* (EP Act) were issued by the Queensland Government on the 11th December 2025. The relevant requirements for noise and vibrations are detailed in Table 1.

Table 1 - ToR for an EIS under the EP Act 1994

ID	Term of reference	Section of this report
9.98	Describe and illustrate the locations of any sensitive receptors that are listed in Schedule 1 of the <i>Environmental Protection (Noise) Policy 2019</i> . Also describe any other environmental values that could be impacted by emissions from the project.	Section 2.1 Section 3.2
9.99	Describe the sources and characteristics of noise and vibration that would be emitted during the construction, commissioning, operation, upset conditions, and closure of the project.	Section 4.6 Section 7.3
9.100	Conduct a noise and vibration impact assessment in accordance with the latest version of the Department's <i>Noise and vibration—EIS information guideline</i> (ESR/2020/5305) (DESI 2024) and <i>Applications requirements for activities with noise impacts</i> (ESR/2015/1838) (DESI 2024). The assessment must address low-frequency (<200 Hz) noise emissions and potential cumulative impact of the project with other emissions of noise from any existing developments and known possible future development in the area.	Section 4 Section 4.8.1 Section 4.8.2 Section 6 Section 7.1 - 7.3
9.101	Demonstrate that the project can meet the environmental objectives and performance outcomes in Schedule 8 of the EP Regulation.	Section 5 Section 7.3
9.102	Describe how the proposed activity would be managed to be consistent with best practice environmental management, including the control of background creep in noise as outlined in the <i>Environmental Protection (Noise) Policy 2019</i> . The EIS must address the compatibility of the project's noise emissions with existing or potential land uses in surrounding areas. Potential land uses might be gauged from the zonings of local planning schemes, State Development Areas or other relevant planning frameworks.	Section 5 Section 7.3
9.103	Describe how the environmental management objectives for noise and vibrations would be achieved, monitored, audited and reported, and how corrective actions would be managed.	Section 5 Section 7.3

1.5 Limitations

Publicly available data/design information provided by the Queensland Government, Geoscience Australia, and PSMA Australia Ltd were used as inputs to the noise models developed for this assessment. Various assumptions were made, and these are provided as part of the assessment methodology.

This assessment was based on best practice methodologies at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this document. Where this document indicates that information has been provided by third parties, no independent verification of this information has been completed except as stated. No liability is assumed for any inaccuracies in, or omissions to, that information. Furthermore, this assessment should be read in its entirety. No responsibility is accepted for use of any part of this document in any other context or for any other purpose or by third parties.

2 Existing environment

2.1 Noise sensitive receptors

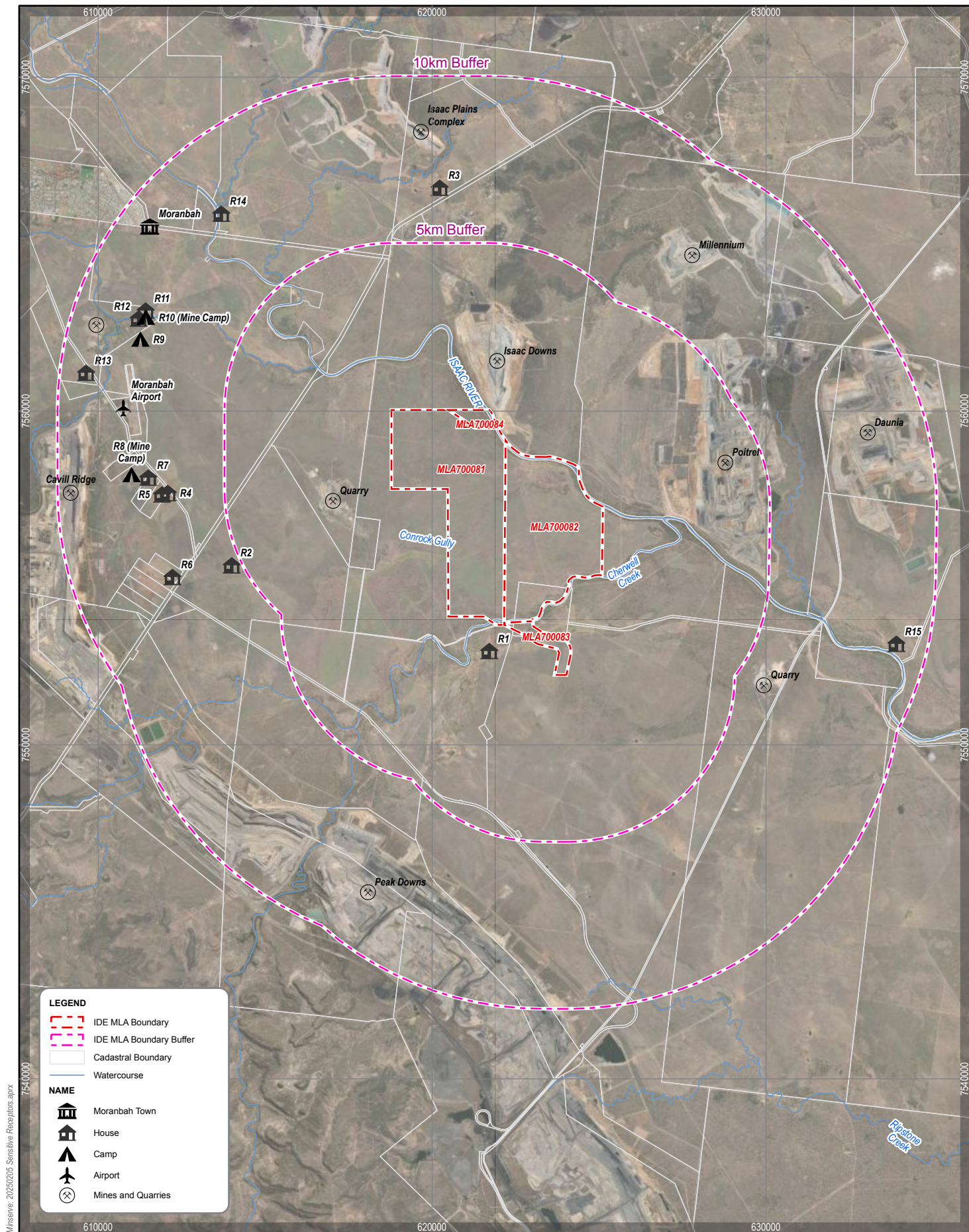
The Project is located approximately 15 km southeast of Moranbah. It is largely located on Winchester Downs station (Lot 8 SP277834) and has overlaps with a State Reserve (Lot 9 GV33) which has grazing rights for the owners of Winchester Downs, a local road used to access Winchester Downs, the Isaac River and Cherwell Creek.

Winchester Downs station is a pastoral operation with the land within the mining lease (ML) application areas primarily used for grazing. The State Reserve is a nominated stock route disconnected from other stock routes in the region.

There is a single sensitive receptor (Winchester Downs homestead, R01) within approximately 1.2 km of the proposed mining activities. Other sensitive receptors are located within approximately 10 km. All noise sensitive receptors identified for this assessment are listed in Table 2 and are shown in Figure 3.

Table 2 - Noise sensitive receptors

Receptor	Receptor Description	Coordinates, GDA2020	
		Easting, m	Northing, m
R01	House	621714.4	7552797.5
R02	House	614000.9	7555362.9
R03	House	620228.9	7566671.9
R04	House	612085.4	7557528.0
R05	House	611915.1	7557488.3
R06	House	612226.5	7555013.6
R07	House	611504.9	7557990.9
R08	Mine camp	611001.1	7558081.9
R09	Mine camp	611266.3	7562139.4
R10	Mine camp	611430.9	7562792.9
R11	House	611422.2	7562992.4
R12	House	611214.9	7562753.9
R13	House	609640.4	7561130.4
R14	House	613687.9	7565892.9
R15	House	633907.3	7553014.0
Moranbah	Town	611544.2	7565526.3



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Sensitive Receptors

2.2 Noise monitoring

Ambient noise monitoring was conducted at Winchester Downs by Simpson Engineering Group (*Winchester Downs Ambient Noise Survey*, report 241023D03, issued 1st September 2025). A copy of the report is supplied in Appendix A.

2.2.1 Methodology and equipment

A summary of the monitoring methodology is provided below:

- The noise measurements were conducted over a two-week period between Thursday 4th July and Thursday 17th July 2025.
- The noise measurement methodology follows the *Noise Measurement Manual V4.01* (Department of Environment and Science, 2020).
- The equipment employed for the unattended survey was a Type 1 Norsonic NOR 139 sound level meter. A portable weather station was setup adjacent to the noise logger during the noise monitoring period.

Overall, the weather during the monitoring period was considered ideal with only a few short periods of strong wind speeds greater than 5 m/s. Noise measurements impacted by inclement weather (wind speed greater than 5 m/s or rain greater than 0.2 mm/h) were reviewed by Simpson Engineering Group and data identified as weather-impacted were excluded from the analysis.

2.2.2 Monitoring results

A summary of the measured rating background levels (RBLs) are reproduced in Table 3. The highest RBL occurred during the night and may have been due to nearby insect noise as well as household activity.

Table 3 - Background noise levels at Winchester Downs in July 2025

Monitoring location	Rating background noise levels (RBL), dB(A)		
	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
R01 Winchester Downs	24	21	25

3 Noise and vibration criteria

This section details the relevant noise and vibration legislations and guidelines to comply with the requirements listed in the ToR for an EIS under the EP Act issued by the Department of Environment, Science, Tourism and Innovation (DETSI) for the Project.

3.1 Environmental Protection Regulation 2019

The environmental objectives and performance outcomes detailed in Schedule 8, Part 3, Division 1 of the *Environmental Protection Regulation 2019* (EP Regulation) are reproduced in Table 4.

Table 4 - Schedule 8, Part 3, Division 1 of the EP Regulation

Environmental objective	Performance outcomes
The activity will be operated in a way that protects the environmental values of the acoustic environment.	1 - Sound from the activity is not audible at a sensitive receptor. 2 - The release of sound to the environment from the activity is managed so that adverse effects on environmental values, including health and wellbeing and sensitive ecosystems, are prevented or minimised.

3.2 Environmental Protection (Noise) Policy 2019

3.2.1 Acoustic quality objectives

The purpose of the *Environmental Protection (Noise) Policy 2019* (EPP (Noise)) is to achieve the object of the EP Act and subordinate EP Regulation in relation to the acoustic environment. Specifically, the environmental values to be protected under the EPP (Noise) are the qualities of the acoustic environment that are conducive to:

- Protecting the health and biodiversity of ecosystems;
- Human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to sleep, study, learn or be involved in recreation, including relaxation and conversation; and
- Protecting the amenity of the community.

Acoustic quality objectives for various sensitive receptors and for different periods of the day are provided in Schedule 1 of the EPP (Noise). The relevant acoustic quality objectives for this assessment, are provided below in Table 5.

Table 5 - Schedule 1 of the EPP (Noise)

Sensitive receptor	Time of day	Acoustic quality objective (measured at receptor), dB(A)			Environmental value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
Residence (for outdoors)	Daytime and evening	50	55	65	Health and wellbeing
Residence (for indoors)	Daytime and evening	35	40	45	Health and wellbeing
	Night-time	30	35	40	Health and wellbeing, in relation to the ability to sleep

In order to demonstrate compliance with the residence (for indoors) night-time acoustic quality objective, a correction is required to determine a corresponding outdoor noise level, which considers an appropriate level of attenuation across a façade to indoor areas. The *Noise and vibration - EIS information guideline* (ESR/2020/5305) recommends an outdoor to indoor attenuation value of 7 dB, which is appropriate for typical Queensland buildings with open windows.

The relevant EPP (Noise) noise criteria at the most exposed building façade are provided below in Table 6.

Table 6 - EPP (Noise) noise criteria

Sensitive receptor	Time of day	Acoustic quality objective (measured at receptor), dB(A)		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Residence (at the building façade)	Daytime and evening	42	47	52
	Night-time	37	42	47

3.2.2 Background creep

The EPP (Noise) states that – to the extent it is reasonable to do so, noise must be dealt with in a way that ensures-

- *the noise does not have any adverse effect, or potential adverse effect, on an environmental value under this policy; and*
- *background creep in an area or place is prevented or minimised.*

Background creep is not quantified in the EPP (Noise) and therefore, guidance is sought in the superseded *Environmental Protection (Noise) Policy 2008* which states that - to the extent that it is reasonable to do so, noise from an activity must not be

- *for noise that is continuous noise measured by $L_{A90,T}$ more than nil dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$; or*
- *for noise that varies over time measured by $L_{Aeq,adj,T}$ more than 5dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$.*

Based on the measured background noise levels detailed in Table 3, the threshold background noise level of 30 dB(A) was adopted in accordance with the *Model Mining Conditions Guideline* (see footnote from Table 8).

The resultant background creep criteria derived for the Project are detailed in Table 7.

Table 7 - Background creep criteria

Sensitive receptor	Background creep criteria, $L_{Aeq,adj,1hr}$, dB(A)		
	Day	Evening	Night
	7 am to 6 pm	6 pm to 10 pm	10 pm to 7 am
Residence (for outdoors)	35	35	35

3.3 Model Mining Conditions Guideline

The *Model Mining Conditions Guideline* provides a set of model conditions to form general environmental protection commitments given for mining activities, and environmental authority conditions for resource activities – mining activities imposed by the administering authority under the EP Act.

3.3.1 Airborne noise

Schedule D, Table D1 of the *Model Mining Conditions Guideline* details noise limits not to be exceeded at a sensitive place or commercial place. The noise limits are reproduced in Table 8.

Table 8 - Schedule D Table D1 of the Model Mining Conditions Guideline

Sensitive place						
Noise level dB(A)	Monday to Saturday			Sunday and public holidays		
measured as:	7 am to 6 pm	6 pm to 10 pm	10 pm to 7 am	9 am to 6 pm	6 pm to 10 pm	10 pm to 9 am
L _{Aeq,adj,15mins}	CV = 50 AV = 5	CV = 45 AV = 5	CV = 40 AV = 0	CV = 45 AV = 5	CV = 40 AV = 5	CV = 35 AV = 0
L _{A1,adj,15mins}	CV = 55 AV = 10	CV = 50 AV = 10	CV = 45 AV = 5	CV = 50 AV = 10	CV = 45 AV = 10	CV = 40 AV = 5
Commercial place						
Noise level dB(A)	Monday to Saturday			Sunday and public holidays		
measured as:	7 am to 6 pm	6 pm to 10 pm	7 am to 6 pm	6 pm to 10 pm	7 am to 6 pm	6 pm to 10 pm
L _{Aeq,adj,15mins}	CV = 55 AV = 10	CV = 50 AV = 10	CV = 45 AV = 5	CV = 50 AV = 10	CV = 45 AV = 10	CV = 40 AV = 5

1. CV = Critical Value
2. AV = Adjustment Value
3. bg = background noise level (L_{A90,adj,15mins}) measured over 3-5 days at the nearest sensitive receptor
4. To calculate noise limits in Table D1:
 - a. If $bg \leq (CV - AV)$: Noise limit = $bg + AV$
 - b. If $(CV - AV) < bg \leq CV$: Noise limit = CV
 - c. If $bg > CV$: Noise limit = $bg + 0$
5. In the event that measured bg (L_{A90,adj,15mins}) is less than 30 dB(A), then 30 dB(A) can be substituted for the measured background level
6. If the project is unable to meet the noise limits as calculated above alternative limits may be calculated using the processes outlined in the "Planning for Noise Control" guideline.

Based on the measured background noise detailed in Table 3, the threshold background noise level of 30 dB(A) was adopted in accordance with the *Model Mining Conditions Guideline* (see footnote from Table 8).

The resultant *Model Mining Conditions Guideline* noise criteria derived for the Project are detailed in Table 9.

Table 9 - Model Mining Conditions Guideline noise criteria

Sensitive place						
Noise level dB(A)	Monday to Saturday			Sunday and public holidays		
measured as:	7 am to 6 pm	6 pm to 10 pm	10 pm to 7 am	9 am to 6 pm	6 pm to 10 pm	10 pm to 9 am
L _{Aeq,adj,15mins}	35	35	30	35	35	30
L _{A1,adj,15mins}	40	40	35	40	40	35
Commercial place ¹						
Noise level dB(A)	Monday to Saturday			Sunday and public holidays		
measured as:	7 am to 6 pm	6 pm to 10 pm	7 am to 6 pm	6 pm to 10 pm	7 am to 6 pm	6 pm to 10 pm
L _{Aeq,adj,15mins}	40	40	35	40	40	35

1. No commercial places are identified surrounding the Project. The derived criteria are provided for context only.

3.3.2 Blasting noise and vibration

Schedule D, Table D2 of the *Model Mining Conditions Guideline* details blasting noise and vibration limits not to be exceeded at a sensitive place or commercial place. The noise limits are reproduced in Table 10.

Table 10 - Schedule D Table D2 of the *Model Mining Conditions Guideline*

Blasting noise limits	Sensitive or commercial place limits	
	7 am to 6 pm	6pm to 7 am
Airblast overpressure	115 dB(Linear) peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB(Linear) peak at any time	Either no blasting or limits justified by proponent not less stringent than 7 am - 6 pm
Ground vibration peak particle velocity	5 mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time	Either no blasting or limits justified by proponent not less stringent than 7 am - 6 pm

3.4 Low frequency noise

Low frequency noise criteria are not detailed in the EP Act, associated EP Regulation and EPP (Noise), nor the *Model Mining Conditions Guideline*. Therefore, guidance is sought in the *Ecoaccess assessment of low frequency noise guideline* (Department of Environment and Heritage Protection, now Department of Environment and Science, 2004).

The guideline details an indoor screening criterion of 50 dB(Linear) to avoid complaints of low frequency noise annoyance. Similar to the acoustic quality objectives in Section 3.2.1, an outdoor to indoor attenuation value of 7 dB, which is appropriate for typical Queensland buildings with open windows, is considered. Therefore, the low frequency noise outdoor screening criterion is 57 dB(Linear).

3.5 Synthesis

The Project is operating continuously 24 hours per day, 7 days per week. Activities are repetitive and therefore, equivalent noise levels over a 15-minute and 1-hour period are expected to be identical.

A synthesis of the Project's most stringent noise and vibration criteria is detailed in Table 11.

Table 11 - Project noise and vibration criteria

Residence	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
Airborne noise (outdoors)	L _{Aeq,adj,1hr} 35 dB(A)	L _{Aeq,adj,1hr} 35 dB(A)	L _{Aeq,adj,1hr} 30 dB(A)
Low frequency noise (outdoors)	L _{Zeq,adj,1hr} 57 dB(Linear)	L _{Zeq,adj,1hr} 57 dB(Linear)	L _{Zeq,adj,1hr} 57 dB(Linear)
Airblast overpressure	115 dB(Linear) peak (9 out of 10 consecutive blasts) 120 dB(Linear) peak at any time	No blasting	No blasting
Ground-borne vibration	5 mm/second peak particle velocity (9 out of 10 consecutive blasts) 10 mm/second peak particle velocity at any time	No blasting	No blasting

4 Noise modelling

4.1 Noise model and propagation algorithm

The noise model was developed using SoundPLAN v8.2, an environmental noise modelling software suite from SoundPLAN GmbH. SoundPLAN facilitates the development of detailed 3D models comprising ground contours, noise sources, building footprints and heights, noise barriers and other factors that influence the emission and propagation of noise.

The model considered noise sources, receivers and the effect of distance, ground topography, atmospheric attenuation, and obstacles such as barriers and buildings. To predict noise emissions, SoundPLAN implements the Conservation of Clean Air and Water Europe (CONCAWE 1981) algorithm. The CONCAWE algorithm is specifically designed for large industrial facilities and incorporates the influence of wind effects and the stability of the atmosphere to account for neutral and adverse weather conditions.

4.2 Calculation parameters

When predicting the noise level at any given point, the study accounted for:

- The contribution of any noise sources within 10,000 m of each point.
- The contribution of any acoustic waves reflected off surfaces either:
 - Within 1,000 m of each point, or
 - Up to 500 m from the source.

Noise contours were interpolated from a 50 m grid. Noise levels were calculated with a tolerance of ± 0.1 dB(A).

4.3 Meteorological conditions

When predicting the noise level, due consideration must be given to the possible effects of weather conditions in the vicinity of the noise sources and receptors. The prevailing and worst-case meteorological conditions (wind, temperature, humidity and temperature inversions) must be determined, and noise levels must be calculated for these meteorological conditions.

A review of the predicted wind roses supplied by the air quality consultant Katestone Environmental Australia (*Isaac Downs Extension: Air Quality Assessment*, January 2026) and reproduced in Appendix B concluded that source-to-receiver wind speeds at 10 m height of 3 m/s or below do not occur for 30 percent of the time or more in any assessment period (day, evening, night) in any season and therefore, wind is not considered a feature of the area according to the definition in the *Ecoaccess planning for noise control guideline* (Department of Environment and Heritage Protection, now Department of Environment and Science, 2016).

In addition, data was not available to confirm if temperature inversion occurs more than 30 percent of the total night period during winter (June, July and August) and therefore, the default inversion parameters are considered for the night period in accordance with the *Ecoaccess planning for noise control guideline*.

The neutral (day, evening and night) and adverse (night only, includes temperature inversion) meteorological conditions for the assessment are detailed in Table 12.

Table 12 - Meteorological conditions

Parameter	Neutral weather Day, evening and night	Adverse weather Night
Temperature	10 degrees Celsius	10 degrees Celsius
Humidity	70%	90%
Pasqual stability class	D	F
Wind speed	0 m/s	2 m/s from source to receptor

4.4 Terrain

A digital elevation model (DEM) of the Project area was created for each assessment year as follow:

- The proponent supplied landform elevations for each year for the ML application areas
- The proponent supplied light detection and ranging (LiDAR) data for an 18 km x 15 km area around the ML application areas
- 1 second SRTM derived hydrological DEM sourced from Elvis (dated 2000) beyond the 18 km x 15 km area.

The DEM was converted from the raster file format to a comma separate value (CSV) file format with each line within the CSV file specifying elevation heights at corresponding spatial coordinates.

The CSV file was imported into SoundPLAN as elevation heights allowing SoundPLAN's triangulation algorithms to generate a digital ground model (DGM). This DGM is adopted to be representative of the study area's terrain for the current year. The 1.0 m resolution of the DEM is retained for the DGM.

4.5 Ground absorption and vegetation

Large areas of hard ground (including the pits, and adjacent mines) were digitised from high resolution aerial photography. These areas were modelled as acoustically 'hard' (i.e. mostly reflective, ground absorption of 0.25) and the remaining areas were modelled as acoustically 'soft' (i.e. absorbent, ground absorption of 1.0) throughout the Project model area.

4.6 Modelled scenarios

Whilst the Project comprises a single open cut pit, the pit development will commence in the south and expand to the north. Waste will initially be stockpiled to the south-west of the Project area. As the excavation progresses and pit depth increases, attenuation of mining equipment at the coal floor is expected due to topographic shielding provided by the pit walls.

The modelled years are considered worst-case scenarios for the nearest receptor R01 to the south of the Project area, as follows:

- Year 2029: opening year, with in-pit excavation, waste route and waste stockpile to the south of the Project area
- Year 2034: peak coal production and peak waste production year, waste route and waste stockpile to the south of the Project area, in-pit excavation to the north of the Project area
- Year 2042: final full year of operation, with production ramping down.

The proposed mining fleet for the opening, peak and final year of operation is detailed in Table 13. The location of the mining fleet for each modelled year is shown in Figure 4, Figure 5 and Figure 6.

Table 13 - Mining fleet

Equipment	Model	Location	Year 2029	Year 2034	Year 2042
Major equipment					
Coal haul truck	CAT 793	Coal haul road	2	3	3
Coal road train	Kenworth C509	Coal haulage between ROM to CHPP	5	5	5
Dragline	Bucyrus 1370	Pit	1	1	1
Drill	N/A	Pit	1	1	1
Dozer fleet production	CAT D11T	Pit	4	8	6
Excavator 1	Liebherr 9350	At start of waste haul road	1	1	1
Excavator 2	Liebherr 9350	At start of coal haul road	1	1	0
Waste haul truck	CAT 793	Waste haul road	6	7	0
Ancillary equipment					
Dozer, coal floor	CAT D10T	At start of coal haul road	1	1	1
Dozer, dig bench	CAT D10T	At start of waste haul road	1	1	0
Dozer, dragline support	CAT D11T	Near dragline	1	1	1
Dozer, misc. duties	CAT D10T	Near drill	1	1	0
Dozer, waste dump	CAT D10T	At end of waste haul road	1	1	0
Excavator	Hitachi EX1200	With dozer fleet production	1	1	1
Grader medium	CAT 16M	On road train road between ROM and CHPP	1	1	1
Grader large	CAT 24M	Anywhere on either waste road or coal road	1	1	1
Service truck	CAT 777	On any road	1	1	1
Water truck 1	CAT 785	On road train road between ROM and CHPP	1	1	1
Water truck 2	CAT 785	Anywhere on either waste road or coal road	1	1	1
Wheel loader	CAT 994	ROM pad (end of coal haul road)	1	1	1

4.7 Sound power levels

Sound power levels (SWLs) of the modelled mining equipment were sourced from publicly available approved environmental impact statements and manufacturer's data. SWLs are detailed in Table 14.

Table 14 - Sound power levels for mining equipment

Equipment	SWL in dB(Linear) per octave band centre frequency, Hz								SWL, dB(A)
	63	125	250	500	1000	2000	4000	8000	
Dragline Bucyrus 1370	107	118	114	113	111	106	100	95	115
Drill	117	124	116	114	113	113	108	104	119
Dozer CAT D10T	111	117	113	114	112	108	102	97	116
Dozer CAT D11T	121	111	112	119	112	113	103	92	119
Excavator Hitachi EX1200	111	105	100	100	111	111	106	98	115
Excavator Liebherr 9350	115	126	122	121	119	114	108	103	123
Grader CAT 16M	102	111	104	109	110	105	100	100	113
Grader CAT 24M	102	118	113	112	110	107	101	95	115
Haul truck CAT 793	125	125	120	116	111	108	102	97	118
Road train Kenworth C509	120	120	115	111	106	103	97	92	113

Service truck CAT 777	118	116	112	109	106	104	97	90	112
Water truck CAT 785	114	120	115	116	114	113	109	97	119
Wheel loader CAT 994	117	123	119	111	107	101	91	83	115

4.7.1 Annoying characteristics

Noise emissions from the proposed mining equipment does not include annoying characteristics as defined in the *Noise Measurement Manual V4.01* and therefore, no correction for tonal or impulsive characteristics were included in the noise model.

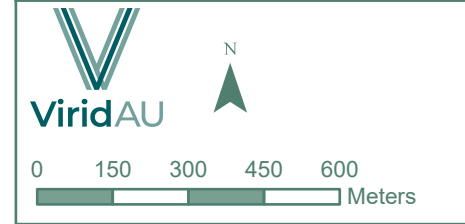
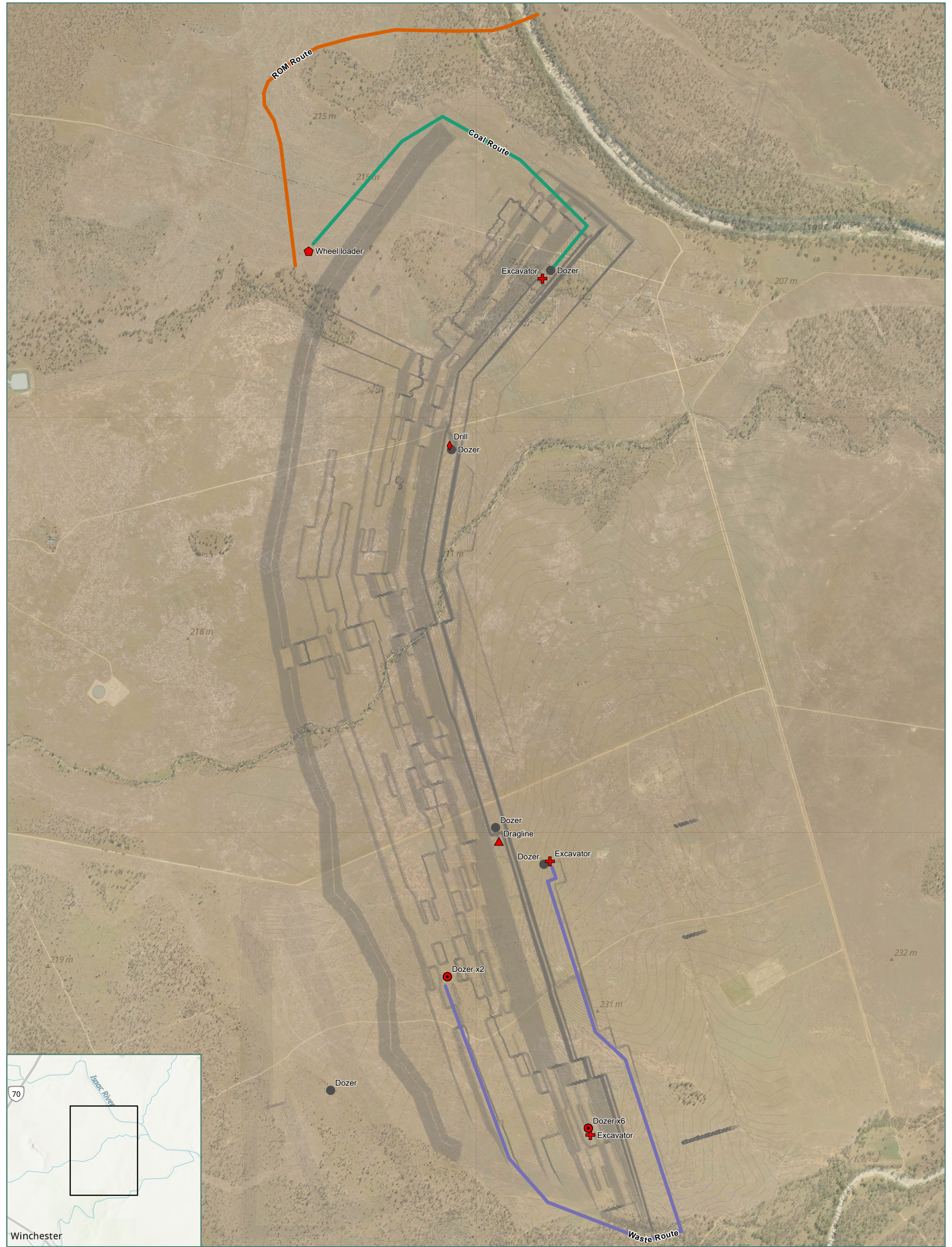
4.7.2 Usage factors and load

The SWLs detailed in Table 14 were corrected to account for the usage factors and load of specific equipment as follows:

- Dozers are scheduled as operating 57% of the time
- Excavators assisting dozer push are scheduled as operating 66% of the time
- Excavators loading haul trucks are scheduled as operating 66% of the time
- Excavators loading haul trucks are filling up to 15 waste trucks per hour and 12 coal trucks per hour
- When operating, excavators loading haul trucks are operating at full load for 20% of the time (loaded bucket) and reduced load for the remaining 80% of the time (empty bucket and moving)
- Haul trucks engine loads vary significantly along the haul routes, as follows:
 - Opening year 2029:
 - Coal: 36 to 100% when loaded, 0 to 69% when empty
 - Waste: 5 to 100% when loaded, 5 to 99% when empty
 - The average load for haul trucks is 53% for an average speed of 32 km/h
 - Peak production year 2034:
 - Coal: 38 to 100% when loaded, 0 to 91% when empty
 - Waste: 5 to 100% when loaded, 0 to 100% when empty
 - The average load for haul trucks is 49% for an average speed of 27 km/h
 - Final full year of production 2042
 - Coal: 19 to 100% when loaded, 0 to 71% when empty
 - The average load for haul trucks is 55% for an average speed of 35 km/h
 - For consistency in the modelling assumptions between the 3 modelled scenarios, the average load for haul trucks was modelled as 50% with an average speed of 30 km/h.



Figure 4 - Equipment Locations Year 2029



Legend

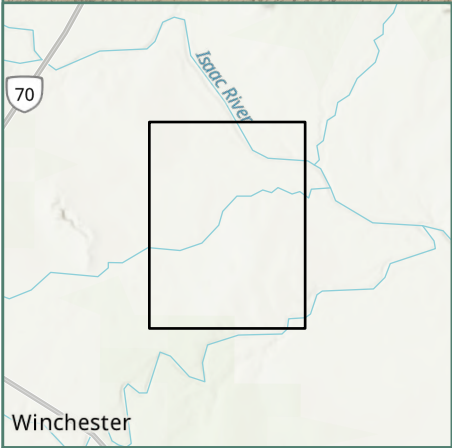
Modelled Noise Sources

- Waste Route: Waste Truck x 7, Large Grader, Service Truck, Water Truck
- Coal Route: Coal Haul Truck x 3, Large Grader, Service Truck, Water Truck
- ROM Route: ROM Road to CHP, Grader, Service Truck, Water Truck

Equipment Locations

- Dozer x 2 & 6
- Dragline
- Drill
- Excavator
- Wheel loader
- Dozer

Figure 5 - Equipment locations Year 2034



Legend
Modelled Noise Sources
— Coal Route: Coal Haul Truck x 3, Large Grader, Service Truck, Water Truck
— ROM Route: ROM Road to CHP, Grader, Service Truck, Water Truck

Equipment Locations
● Dozer x 6
▲ Dragline
◆ Drill
✚ Excavator
◼ Wheel loader
● Dozer

Figure 6 - Equipment Locations Year 2042

4.8 Predicted noise levels

4.8.1 Airborne noise

The predicted noise levels for the years 2029, 2034 and 2042 under neutral and adverse weather conditions are shown in Table 15. Exceedances of the most stringent night criterion are displayed in red and in bold.

The predicted noise contour maps are shown in Appendix C.

Table 15 - Predicted noise levels

Receptor	Description	Predicted noise levels $L_{Aeq,adj,1hr}$, dB(A)					
		Year 2029		Year 2034		Year 2042	
		Neutral	Adverse	Neutral	Adverse	Neutral	Adverse
R01	House	33	39	34	40	28	34
R02	House	<15	18	<15	17	<15	<15
R03	House	<15	<15	<15	<15	<15	17
R04	House	<15	<15	<15	<15	<15	<15
R05	House	<15	<15	<15	<15	<15	<15
R06	House	<15	<15	<15	<15	<15	<15
R07	House	<15	<15	<15	<15	<15	<15
R08	Mine camp	<15	<15	<15	<15	<15	<15
R09	Mine camp	<15	<15	<15	<15	<15	<15
R10	Mine camp	<15	<15	<15	<15	<15	<15
R11	House	<15	<15	<15	<15	<15	<15
R12	House	<15	<15	<15	<15	<15	<15
R13	House	<15	<15	<15	<15	<15	<15
R14	House	<15	<15	<15	<15	<15	<15
R15	House	<15	<15	<15	<15	<15	<15
Moranbah	Town	<15	<15	<15	<15	<15	<15

Exceedances of the airborne noise criteria of 4 dB(A) to 10 dB(A) are predicted for all years under adverse weather conditions for the night period at receptor R01. Exceedances of up to 4 dB(A) are predicted under neutral conditions for the night period at receptor R01 for years 2029 and 2034.

Operations are predicted to comply during the day and evening periods (no adverse conditions during these periods – refer to Section 4.3) at all receptors for all years.

A review of the source contributions at receptor R01 under adverse weather conditions is provided in Table 16.

Table 16 - Noise source contribution at receptor R01

Rank	Year 2029		Year 2034		Year 2042	
	Source	Level	Source	Level	Source	Level
1	Waste trucks x3 (south)	35	Waste truck x7 (south)	37	Dozer fleet	34
2	Dozer (waste dump)	32	Dozer (waste dump)	32	Coal truck x3	20
3	Waste truck x3 (north)	30	Excavator (dig bench)	31	-	-
4	Wheel loader	30	Dozer x2 (pit)	29	-	-

4.8.2 Low frequency noise

The predicted unweighted noise levels at the most exposed receptor R01 are detailed in Table 17.

Table 17 - Predicted unweighted noise levels

Receptor	Description	Predicted noise levels $L_{Zeq,adj,1hr}$, dB(Linear)					
		Year 2029		Year 2034		Year 2042	
		Neutral	Adverse	Neutral	Adverse	Neutral	Adverse
R01	House	47	51	48	51	39	43

Predicted levels comply with the low frequency noise screening criterion of 57 dB(Linear) $L_{Zeq,adj,1hr}$.

4.8.3 Construction noise

The modelled scenarios deliberately omit noise emissions associated with the construction and commissioning phases (taking place during the first year), as well as mine closure activities. These phases will involve fewer mobile fleet units and are therefore expected to produce lower noise levels than the operational scenarios presented in this worst-case assessment.

Since the chosen scenarios reflect the highest potential noise impacts, any emissions arising from construction or closure stages are considered to fall within the bounds of this worst-case assessment.

5 Noise mitigation and alternative arrangements

The review of the major noise source contributions at receptor R01 indicates that the waste activities (haulage, dozer on dump or in pit, excavator) control the noise environment at the Winchester Downs homestead.

Potential noise mitigation measures were reviewed in collaboration with the proponent, including mitigation of the sources (equipment and operations), the path (shielding) and at the receptor.

To achieve compliance at night, noise reductions of up to 10 dB(A) are required for all major noise sources listed in Table 16. A review of the noise mitigation solutions developed by mining equipment specialists such as Minetek, for dozers, excavators and trucks manufacturers as well as a review of alternative equipment (e.g. Komatsu or Liebherr trucks instead of Caterpillar) indicated that noise reductions up to 4 dB(A) for the equipment under investigation may be considered for bespoke silencer kits.

Constructing noise bunds, altering operational hours and re-routing equipment were not found to be operationally or economically effective.

The proponent proposes to enter into an alternative arrangement with the owner of the Winchester Downs homestead for amenity impacts, which could include property modifications resulting in reductions of up to 10 dB(A) inside homestead buildings.

Finally, it is noted that the most stringent airborne noise criteria for the Project are derived from the *Model Mining Conditions Guideline*. This night criterion is at least 5 dB(A) more stringent than background creep and overall, 5 dB(A) more stringent than the noise limits detailed in *Appendix 1 Stated conditions* from the *Coordinator-General's evaluation report on the environmental impact statement* from the adjacent Winchester South project, including the same receptor Winchester Downs homestead. Considering a 35 dB(A) L_{Aeq} criterion during the night period would lead to 4 to 5 dB(A) exceedances under adverse conditions only, which could be mitigated through equipment noise attenuation.

6 Cumulative impact

The Project has the potential for cumulative noise impacts with other mine operations and projects shown on Figure 1 as follows:

- IDM, currently active open cut coal mine, but which will ramp down prior to Project operations
- IPM, currently active open cut coal mine, but which is not predicted to have open cut mining operations during the life of the Project
- Poitrel Mine, active open cut coal mine operated by a Stanmore subsidiary, currently operational and therefore part of ambient noise environment
- Millennium Mine, inactive open cut coal mine operated by a Stanmore subsidiary
- Eagle Downs Mine, an underground coal mining project proposed by a Stanmore subsidiary that has not commenced mining, 3 - 12 km south of the Project
- Winchester South Mine, an open cut coal mining project proposed by Whitehaven Coal that has not commenced mining, 5 - 20 km south east of the Project
- Caval Ridge Mine, active open cut mine operated by BHP, its subsidiaries and partners, currently operational and therefore part of ambient noise environment, 10 km west of the Project
- Peak Downs Mine, active open cut mine operated by BHP, its subsidiaries and partners, currently operational and therefore part of ambient noise environment, 10 km south west of the Project
- Peak Downs Continuation project, a proposed extension of open cut mines operated by BHP, its subsidiaries and partners, 8 - 20 km south of the Project
- Moranbah South Mine, a proposed underground coal mine proposed by Anglo Coal and Exxaro that has not commenced mining with unknown timing for commencement.

A review of the nearest sensitive receptors and their locations relative to the surrounding mines indicated that only the nearest receptor R01 has the potential to be cumulatively impacted by noise from the Project and other proposed projects (i.e. Eagle Downs Mine, Winchester South Mine and the Peak Downs Continuation project) and ongoing mine operations (i.e. Poitrel Mine, Peak Downs Mine and Caval Ridge Mine) , . Other projects and mine operations (i.e. IDM, IPM, Millennium Mine and Moranbah South Mine) are not predicted to result in cumulative impacts due to timing of operations not coinciding with the Project.

The cumulative noise assessment for the nearest sensitive receptor R01 is based on the following documentation:

- Those projects and ongoing mining operations identified above
- Predicted noise levels presented in Section 4.8
- *Caval Ridge Mine - Horse Pit Extension Project, Noise and Vibration Impact Assessment* (SLR, 2021)
 - Includes predicted levels for the Caval Ridge Mine, Peak Downs Mine and Poitrel Mine
- *Assessment Report under the Environmental Protection Act 1994, Eagle Downs Coal Mine Project* (Queensland Government, 2010)
 - Includes predicted levels for the Eagle Downs Mine
- *Winchester South Project, Environmental Impact Statement, Attachment 14, Additional Information, Noise and Vibration* (Renzo Tonin and Associates, 2022)
 - Includes predicted levels for the Winchester South Mine.

It is noted that in absence of detailed modelling for the same years of operations, the worst-case scenarios for each mine or project are considered. It is assumed that the worst-case cumulative 1 hour impact assumes other mines and projects operate concurrent to the Project nominated 1 hour worst-case operation.

The cumulative noise impact assessment results are presented in Table 18.

Table 18 - Predicted cumulative noise levels at receptor R01 - Worst case scenario

Mine	Predicted L _{Aeq} , dB(A)
IDE (Project site)	40
Caval Ridge Mine	22
Peak Downs Mine	22
Eagle Downs Mine	26
Winchester South Mine	31
Poitrel Mine	22
Cumulative impact	41

The cumulative noise levels from the Project and surrounding mines and proposed projects are predicted to exceed the relevant noise criterion of 30 dB(A) L_{Aeq}. The Project is the primary contributor at the Winchester Downs homestead R01.

7 Blasting

The open cut mining methods for the Project include drilling and blasting of pre-strip overburden, overburden, and pit floor for geotechnical stability, allowing for in-pit dumping.

The assessment has been carried out in accordance with Australian Standard AS 2187.2:2006 *Explosives – Storage and use – Part 2 Use of explosives* which states:

“The accurate estimation of ground vibration and airblast levels is a complex task. The blasting process is highly non-linear and the variability of most rock types also contributes to the difficulty in accurate predictions of the environmental outcomes. The random character of the blasting outcomes suggests the need for probability distribution to describe strictly the range of possible ground vibration and airblast levels.

In the absence of either field data or the opportunity to conduct blasting trials in the region of interest, it is possible to estimate the likely ground vibration and airblast levels using simple charge weight scaling laws. Such laws incorporate the charge weight per delay and the distance to the monitoring location. Two site parameters are assumed and these influence the peak level and the rate of decay for the levels.”

7.1 Airblast overpressure

7.1.1 Methodology 1

In accordance with Australian Standard AS 2187.2:2006, airblast overpressure levels can be estimated using the following cube root scaling formula:

$$P = K_a \left(\frac{R}{Q^{1/3}} \right)^\alpha$$

Where:

- P = pressure, kPa
- Q = effective charge mass per delay or MIC, kg
- R = distance from charge, m
- Ka = site constant
- α = site exponent.

For confined blasthole charges, a site exponent α of -1.45 is used and the site constant Ka is commonly in the range 10 to 100. Empirical guidance within the *Blast Vibration Course* (Terrock Consulting Engineers, 1997) have been implemented, referencing analysis of air vibration resulting from confined blasthole charges at a Victorian quarry. The findings indicate that a site constant of 12.7 accurately characterises a well-controlled and well-stemmed blast. This value is assumed for this assessment.

7.1.2 Methodology 2

An alternative methodology was used for this assessment, for consistency with the mines surrounding the Project, such as the Winchester South Project (*Environmental Impact Statement, Attachment 14, Additional Information, Noise and Vibration*, 2022). The alternative methodology is based on a site-specific formula derived by Renzo Tonin and Associates using blasting data at the Rix’s Creek Coal Mine in Singleton, New South Wales:

$$L_p = 167 + 6.5 \log_{10} Q - 23 \log_{10} R$$

Where:

- L_p = airblast overpressure, dB(Linear)
- Q = effective charge mass per delay or MIC, kg
- R = distance from charge, m.

7.2 Ground-borne vibration

In accordance with Australian Standard AS 2187.2:2006, ground-borne vibration can be estimated using the following equation:

$$V = Kg \left(\frac{R}{Q^{1/2}} \right)^{-B}$$

Where:

- V = ground vibration as vector peak particle velocity, mm/s
- Q = effective charge mass per delay or MIC, kg
- R = distance from charge, m
- K_g, B = constants related to site and rock properties for estimation purposes.

When blasting is to be carried out to a free face in average field conditions, site constants of $K_g = 1140$, and a site exponent of $B = 1.6$ are considered.

7.3 Predicted effective charge mass per delay

The predicted effective charge mass per delay (MIC) to achieve compliance with the airblast overpressure and ground-borne vibration criteria listed in Table 11 at various distances from the blasting area, based on a set of potential blasting conditions for the operations, are detailed in Table 19, which included a charge mass per delay of 1,960 kg. This indicative maximum explosive charge is based on the site constants detailed in Section 7.1 and Section 7.2 (a well-controlled blast event and assumed environmental conditions as per the Standard).

Table 19 - Predicted MIC at various distances to achieve compliance with the airblast overpressure criterion

Distance, m	Effective charge mass per delay, kg			
	Airblast	Airblast	Ground-borne vibration	Worst-case
	Methodology 1 AS 2187.2:2006 $\alpha = -1.45$ $K_a = 12.7$	Methodology 2 Rix's Creek Coal Mine		
1,000	483	412	1,129	412
1,250	943	908	1,764	908
1,500	1,630	1,732	2,540	1,630
1,750	2,588	2,988	3,457	2,588
2,000	3,864	4,793	4,515	3,864
2,250	5,501	7,271	5,714	5,501
2,500	7,546	10,556	7,054	7,054
2,750	10,044	14,789	8,536	8,536
3,000	13,040	20,121	10,158	10,158

During mining operations, blasting may take place anywhere within the Project's active pit area. The closest distance between the Project's pit and the nearest sensitive receptor of concern, Winchester Downs homestead (R01), is approximately 1,400 m. All other identified sensitive receptors are too distant to experience adverse impacts from the Project's blasting (i.e. R02-R15 and Moranbah township).

Potential airblast overpressure and ground vibration impacts will be considered as a part of each blast design. To reduce the risk of exceedances at R01, as the Project's mining operations progress to the south of the pit area (e.g. within 1,600 m of Winchester Downs homestead (R01), or the southern 200 m of the pit extent), the standard set of blast conditions may be modified based on operational experience, including changes to the adopted charge mass per delay used to inform Table 19.

Industry best practices will also be applied through the blast design and execution processes to achieve compliance with the Project's airblast overpressure and ground vibration criteria. As required, airblast overpressure and ground vibration monitoring will be conducted during the Project's mining operations to demonstrate compliance, to assist blast management, and if required, to manage blasting complaints.

8 Conclusion

This noise impact assessment was prepared to demonstrate whether the Project can meet the relevant environmental objectives and performance outcomes as stated in the ToR for the Project's EIS under the EP Act.

Airborne operational noise

Exceedances of the airborne noise criteria of 4 dB(A) to 10 dB(A) are predicted for all years under adverse weather conditions for the night period at the nearest receptor Winchester Downs homestead.

Exceedances of up to 4 dB(A) are predicted under neutral conditions for the night period at this receptor for years 2029 and 2034.

Operations are predicted to comply during the day and evening periods at all receptors for all years.

Low frequency noise

Predicted levels comply with the low frequency noise screening criterion.

Construction noise

The modelled scenarios reflect the highest potential noise impacts, any emissions arising from construction or closure stages are considered to fall within the bounds of the worst-case operational assessment.

Cumulative impact

A review of the nearest sensitive receptors and their locations relative to the surrounding mines indicated that only the nearest receptor Winchester Downs, would potentially be subject to cumulative impacts with the Project. The noise levels emitted by other mines at the Winchester Downs homestead range from 22 dB(A) to 31 dB(A), while the Project is predicted up to 40 dB(A). At this receptor, the Project emission is considered the primary contributor.

Blasting

Industry best practices will also be applied through the blast design and execution processes to achieve compliance with the Project's airblast overpressure and ground vibration criteria. As required, airblast overpressure and ground vibration monitoring will be conducted during the Project's mining operations to demonstrate compliance, to assist blast management, and if required, to manage blasting complaints.

Project mitigation measures

Potential noise mitigation measures were reviewed in collaboration with the proponent, including the sources (equipment and operations), the path (shielding) and at the receptor, as follows:

- A review of the noise mitigation solutions developed by mining equipment specialists, dozers, excavators and trucks manufacturers as well as a review of alternative equipment indicated that noise reductions up to 4 dB(A) for the equipment under investigation may be considered for bespoke silencer kits.
- Constructing noise bunds, altering operational hours and re-routing equipment were not found to be operationally or economically effective.

The proponent proposes to enter into an alternative arrangement with the owner of the Winchester Downs homestead for amenity impacts, which could include property modifications resulting in reductions of up to 10 dB(A) inside homestead buildings.

9 References

Regulation, standards and guidelines

- *Terms of reference for an environmental impact statement under the Environmental Protection Act 1994* (Department of the Environment, Tourism, Science and Innovation, December 2025)
- *Environmental Protection Act 1994* (Department of the Environment, Tourism, Science and Innovation, as of October 2025)
- *Environmental Protection Regulation 2019* (Department of the Environment, Tourism, Science and Innovation, as of November 2025)
- *Environmental Protection (Noise) Policy 2019* (Department of the Environment, Tourism, Science and Innovation, August 2019)
- *Noise and vibration—EIS information guideline* (ESR/2020/5305) (Department of Environment, Science and Innovation, 2024)
- *Applications requirements for activities with noise impacts* (ESR/2015/1838) (Department of Environment, Science and Innovation, 2024)
- *Noise Measurement Manual V4.01* (Department of Environment and Science, March 2020)
- *Model Mining Conditions Guideline* (Department of Environment, Science and Innovation, February 2024)
- *Ecoaccess assessment of low frequency noise guideline* (Environmental Protection Agency, November 2004)
- *Australian Standard AS 2187.2:2006 Explosives – Storage and use – Part 2 Use of explosives*

Air quality report

- *Isaac Downs Extension: Air Quality Assessment* (Katestone Environmental Australia, January 2026)

Other mines

- *Winchester Downs Ambient Noise Survey, report 241023D03* (Simpson Engineering Group, September 2025)
- *Winchester South Project, Coordinator-General's evaluation report on the environmental impact statement* (Department of State Development, Infrastructure, Local Government and Planning, November 2023)
- *Winchester South Project, Environmental Impact Statement, Attachment 14, Additional Information, Noise and Vibration* (Renzo Tonin and Associates, 2022)
- *Caval Ridge Mine - Horse Pit Extension Project, Noise and Vibration Impact Assessment* (SLR, 2021)
- *Assessment Report under the Environmental Protection Act 1994, Eagle Downs Coal Mine Project* (Queensland Government, 2010)

Appendix A. Noise monitoring

Ambient noise monitoring was conducted at Winchester Downs by Simpson Engineering Group (*Winchester Downs Ambient Noise Survey*, report 241023D03, issued 1st September 2025).



Simpson Engineering Group

Document title:

Winchester Downs Ambient Noise Survey

Document Type:

Baseline Survey – July 2025

Prepared for:

Stanmore Resources

Document & Date issued:

241023D03 on Monday, 1 September 2025

Reviewed by: Christopher M Simpson BE

Authorised and signed:

by:.....

Mark A Simpson (*Principal*) BE RPEQ

SEG Pty Ltd

U3/1404 Logan Road
Mount Gravatt East, Qld 4122
Ph: 61 7 31172468
Mobile: 0414383172
Email: mark@seggroup.com.au

Revision: 241023D03 241023D03	Date: 23 July 2025 1 Sept 2025	Status: Draft Final	Comment: Minor Typographical changes and update to tabulated measurements
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1 Introduction

SEG has been retained by Stanmore Resources to undertake noise survey at Winchester Downs homestead for the proposed Isaac Downs Extension Project (the Project). This report is a summary of the results of the baseline survey undertaken during July 2025.

2 Site and Monitoring Locations

Winchester Downs Homestead is situated approximately 17km SE of Moranbah, refer to Figure 1.

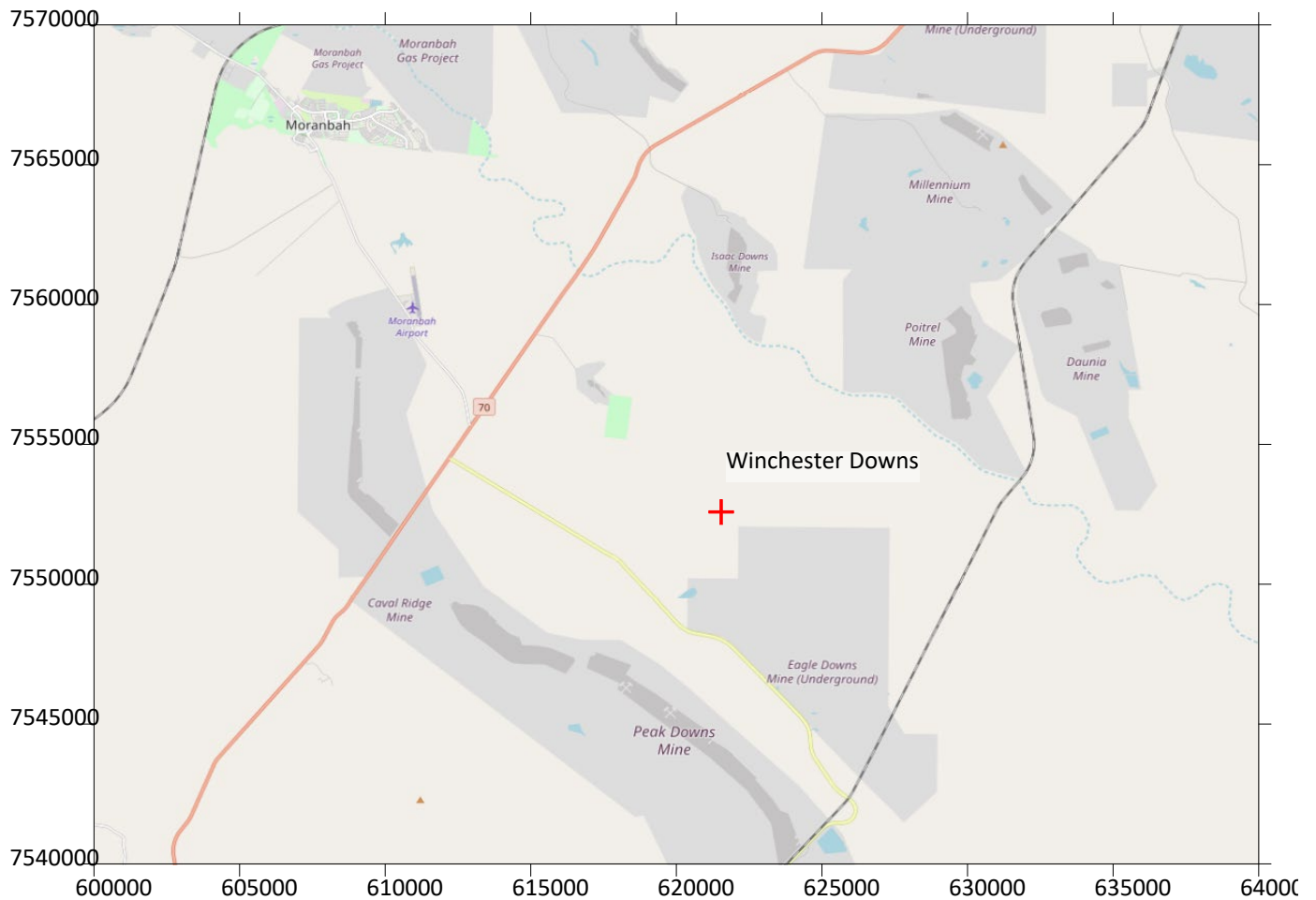


Figure 1: Winchester Downs Locality

There are several mines surrounding the site with the closest Eagle Downs Mine being underground and not operational. The distance and direction to the closest surface mines are contained in Table 1. Refer to Figure 2 for an aerial photograph of the site and surroundings and also showing the noise monitoring locations.

Table 1: Nearby Mines and Quarry

Mine	Distance and Direction
Peak Downs	6km to SW
Caval Ridge	9.6km to WSW
Poitrel	8.5km to ENE
Isaac Downs	7.8km to N
Quarry	5km to NW

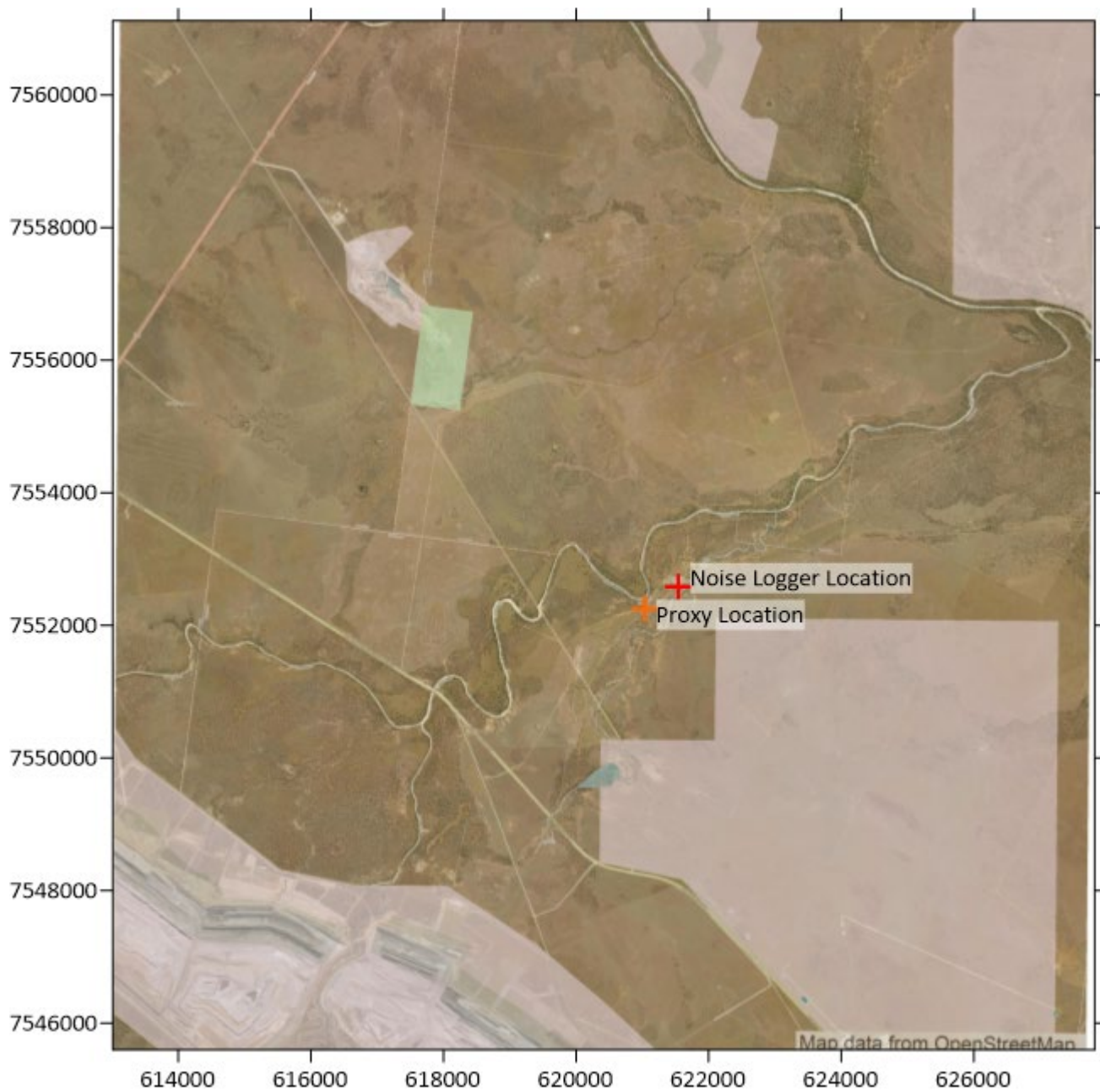


Figure 2: Aerial showing Mines, Roads and Noise Measurement Locations

4 Baseline Noise Survey

The noise measurement methodology follows the Department of Environment and Science Noise Measurement Manual V4.01.

The equipment comprising a Norsonic 139 was configured to record the A weighted L_{Max} , L_{min} , L_{01} , L_{10} , L_{50} , L_{90} , L_{95} and L_{eq} over 15-minute statistical periods. The L_{max} is the maximum noise level occurring during the 15-minute statistical period. The L_{min} is the minimum noise level recorded. The L_{eq} is the energy average noise level and is the constant noise level having the same level as the actual fluctuating noise level. The L_{01} , L_{10} , L_{50} , L_{90} and L_{95} are the noise level exceeded 1%, 10%, 50% 90% and 95% of the time respectively. Hence since the statistical monitoring period is 15 minutes, the L_{01} is the noise level exceeded for 9 seconds and the L_{10} the noise level exceeded for 90 seconds. The time periods considered comprise Day (7am to 6pm), Evening (6pm to 10pm) and Night (10 pm to 7am). The L_{90} is the noise level exceeded 90% of the time and is commonly referred to as the background noise level.

The noise logger was deployed for a two-week period (Thursday 4 July 2025 to Thursday 17 July 2025) at a location within the home paddock, refer to Figure 3 and Figure 4. The site was visited during the evening and night to determine if industrial noise is a feature of the environment. These attended measurements were obtained at the Proxy location. Typically, at night approaching closer to remote dwellings causes dogs to bark and pets to become agitated. Hence a proxy location was selected to avoid adversely affecting the noise levels at the primary noise logging location. The proxy location is approximately 700m from the dwellings.

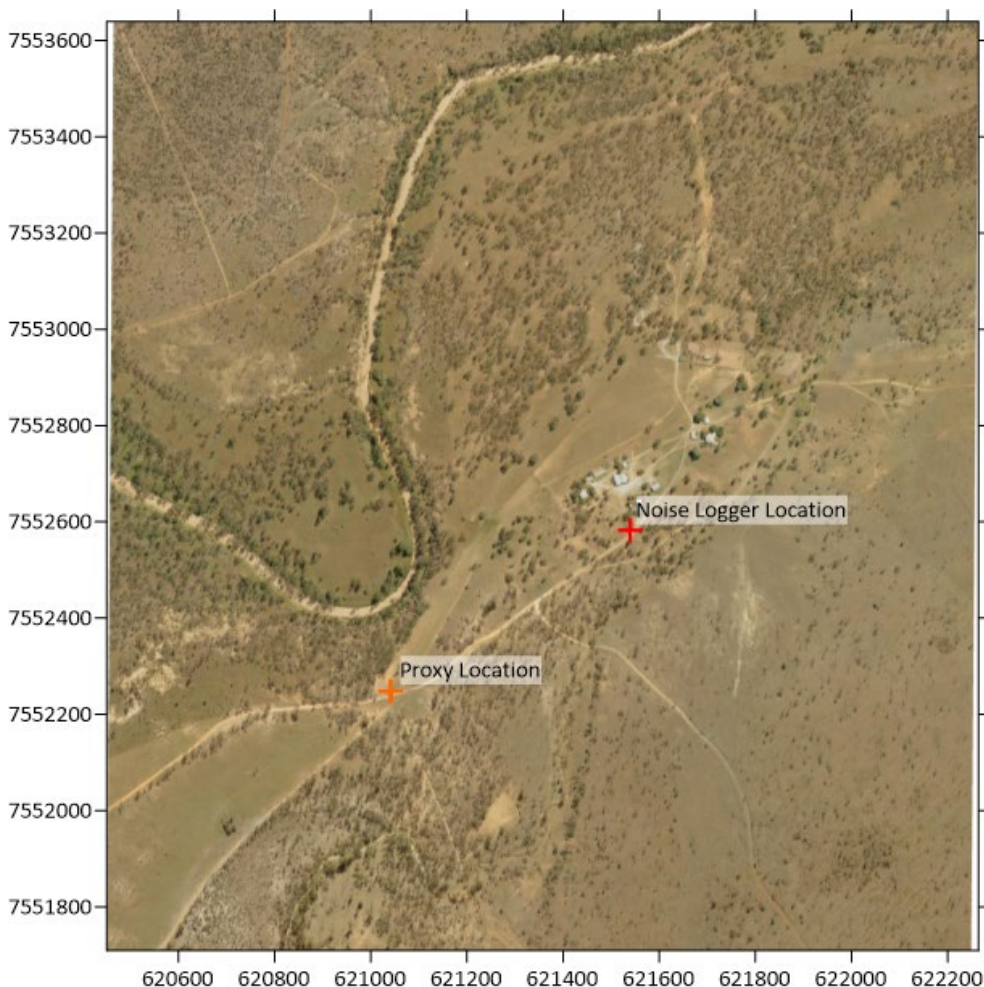


Figure 3: Noise Logging Locations



Figure 4: Noise Logger Location and Nearby Buildings

A photograph of the noise logger and weather station is contained in Figure 5.



Figure 5: Photograph of Deployed Noise Logger

The noise levels have been tabulated in Table 2 and charted in Figure 6. There were short periods of adverse weather on 3 days. Adverse weather is defined as wind speed in excess of 5m/s or rainfall in excess of 0.25mm in an hour period. The adverse weather was due to elevated winds.

Table 2: Measured Noise Levels [dB(A)] at Winchester Downs 2025

Date	L _{A01}			L _{A10}			L _{Aeq}			L _{A90}		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
4/07/2025	55	38	32	44	31	30	44	30	29	25	25	27
5/07/2025	56	45	35	45	44	33	45	43	32	30	37	29
6/07/2025	57	39	35	44	37	33	44	36	32	25	31	26
7/07/2025	59	44	34	47	42	32	47	42	30	25	27	26
8/07/2025	57	48	35	44	42	33	47	42	32	25	32	28
9/07/2025	56	35	36	45	27	33	46	29	32	26	21	25
10/07/2025	56	31	34	45	26	32	45	26	31	24	20	24
11/07/2025	56	30	34	44	26	31	45	26	30	24	20	24
12/07/2025	56	32	33	44	27	31	45	27	30	23	20	25
13/07/2025	56	36	33	44	28	31	44	28	30	23	20	25
14/07/2025	56	38	33	44	32	31	44	31	30	23	21	25
15/07/2025	56	42	33	44	37	31	45	34	29	24	23	25
16/07/2025	56	43	33	44	39	32	44	37	30	23	24	25
17/07/2025	58		33	43		32	46		30	28		24
Median/RBN	56	38	33	44	32	32	45	31	30	24	21	25
Week Day Median/RBN	56	39	33	44	37	32	45	34	30	24	23	25

Note: The L_{A01}, L_{A10} and L_{Aeq} for each period and day is the 50th percentile of the measured noise levels, while the L_{A90} is the lowest 10th percentile as required.

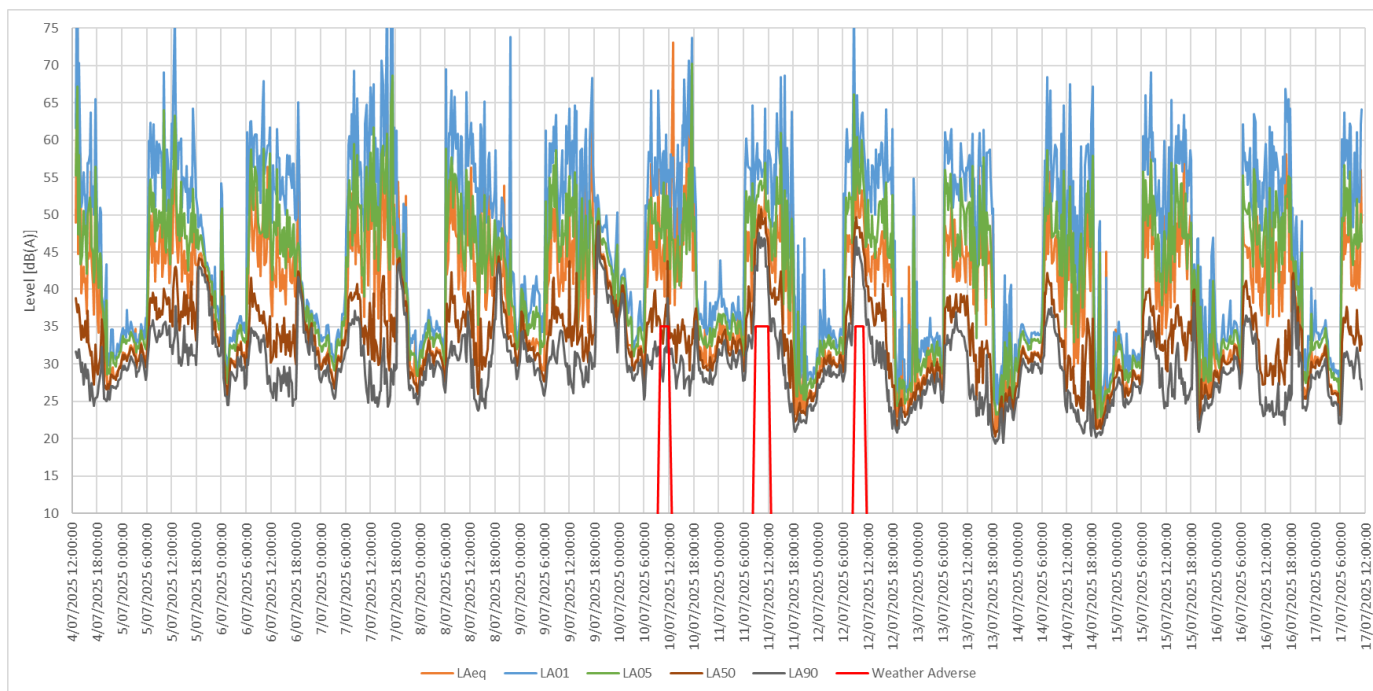


Figure 6: Chart of Sound Pressure Level Measurements on Site.

4.1 Summary of Ambient Noise Logging

The noise monitoring location is extremely quiet during the evening and night. The highest noise levels occurred during the day and may have been due to nearby insect noise as well as household activity. Refer to Table 3 for the measured Rating Background Noise Level (RBL).

Table 3: RBL for the Noise Monitoring Location at Winchester Downs 2025

RBL (dB(A)) for Period		
Day	Evening	Night
24	21	25

4.2 Attended Noise Observations

The proxy noise monitoring location was visited on three occasions at various times of the evening and night. The monitoring periods were without wind and rain. The sky was clear without clouds.

A summary of the 1/3 octave band measurements of the L_{eq} is contained in Table 4. The measurements were obtained over the evening and night of the Wednesday 16th June 2025. The measurements during the early evening were dominated by insect noise (crickets). These are highly tonal noises in the 2,500Hz and 3,150 1/3 octave bands. By the late evening and early night period the insect noise had mostly stopped. However, the measurement was affected by nocturnal animals and the measurements at the proxy location was much noisier than that at the homestead.

The noise levels obtained between 1am and 2 am were free of insect noise and local noises. The overall measured noise level at the proxy location is similar to that obtained at the homestead. It was cool at the time of the measurements with a weak temperature inversion condition. A temperature inversion is a layer in the atmosphere in which air temperature increases with height. This typically occurs at night on clear nights without cloud cover. In this instance the noise comprised distinct low frequency (< 250 Hz) industrial/mining. The noise was coming from the north-east, i.e. from the direction including the group of mines comprising Millenium, Poitrel and Daunia. It is beyond the scope of this investigation to further determine the source of noise. The sound was comparatively constant over time, and it was not possible to readily identify individual components.

Table 4: Attended Measurements During Evening and Night

Frequency Band (Hz)	Leq (dB)		
Date/Time	17 June 01:45	16 June 20:15	16 June 18:45
6.3 Hz	39.8	50.9	38.2
8.0 Hz	39.9	49.0	37.7
10 Hz	38.9	47.3	36.4
12.5 Hz	48.3	45.0	41.9
16 Hz	49.6	45.5	35.3
20 Hz	41.4	39.3	39.3
25 Hz	44.5	43.2	38.8
31.5 Hz	44.9	43.5	40.5
40 Hz	47.9	44.9	40.5
50 Hz	47.5	47.5	41.1
63 Hz	42.6	40.7	35.4
80 Hz	45.5	44.9	40.6
100 Hz	45.0	44.3	38.3
125 Hz	40.7	39.1	33.4
160 Hz	33.7	35.2	28.4
200 Hz	26.5	30.8	23.0
250 Hz	25.6	27.0	22.6
315 Hz	24.1	28.8	21.7
400 Hz	21.9	25.5	19.9
500 Hz	18.4	27.3	19.1
630 Hz	17.7	28.4	19.5
800 Hz	17.3	27.3	20.4
1000Hz	18.5	25.6	21.6
1250 Hz	17.8	25.0	19.8
1600 Hz	18.3	25.1	18.2
2000 Hz	18.5	24.7	19.2
2500 Hz	18.3	23.6	40.4
3150 Hz	18.5	23.7	37.3
4000 Hz	18.7	22.7	23.6
5000 Hz	18.8	22.1	20.3
6300 Hz	19.7	25.1	19.6
8000 Hz	20.4	30.3	21.8
10000 Hz	19.7	23.9	20.4
12500 Hz	20.2	21.6	20.5
16000 Hz	21.0	22.3	21.7
20000Hz	21.8	22.2	23.7
LAeq in dB(A)	33.7	38.1	43.6
LAeq at Homestead Location in dB(A)	31.4	28.1	42.4

5 Prior Monitoring

A survey of the existing noise levels was carried out at Winchester Downs homestead in May 2006 for the Integrated Isaac Plains Project. The ambient noise level measurements were conducted using calibrated ARL EL215 Type 2 environmental noise level meters. The meters were configured to record continuous 15-minute samples over the period Saturday 6 May 2006 to Saturday 13 May 2006, refer to Table 5. It should be noted the ARL EI-214 had a noise floor of 25 dB(A), i.e. it could not measure noise levels below 25 dB(A) and noise levels between 25 dB(A) and 30 dB(A) were affected by proximity to the noise floor.

Table 5: Measurements obtained in 2006

Date	L ₉₀ Background Noise Level			L _{Aeq} Noise Level		
	Day	Evening	Night	Day	Evening	Night
6 May 2006	28	29	28	59	35	31
7 May 2006	29	28	27	47	37	38
8 May 2006	29	26	26	46	33	36
9 May 2006	30	25	25	46	30	41
10 May 2006	28	25	25	43	32	36
11 May 2006	33	34	25	46	39	39
12 May 2006	32	25	25	48	34	49
13 May 2006	30	28	26	52	34	42
14 May 2006	30	25	25	46	32	39
15 May 2006	-	-	25	-	-	39
Median	25	25	25	47	34	39

A survey of the existing noise levels was carried out at Winchester Downs over a period of 8 days from Tuesday 31 March 2009 to Tuesday 7 April 2009 for the Millenium Mine Expansion Project. The calibrated ARL EL215 Type 2 environmental noise logger recorded the noise level statistics in hourly intervals. Refer to Table 6 and Figure 7 for the 2009 measurements at Winchester Downs.

Table 6: Measurements obtained at Winchester Downs Homestead in 2009

Date	L _{A90} (60 minute) Background Noise Level			L _{Aeq} (60 minute) Noise Level				L _{A10} (60 minute) Noise Level		
	Day	Evening	Night	24 hour	Day	Evening	Night	Day	Evening	Night
31 March 2009	32	29	26	53	50	42	30	47	41	29
1 April 2009	32	32	27	48	48	48	38	44	45	40
2 April 2009	32	29	26	51	48	43	30	44	42	30
3 April 2009	35	32	27	56	52	48	36	47	47	40
4 April 2009	31	29	27	49	48	43	38	47	44	34
5 April 2009	32	30	30	51	50	43	34	50	37	35
6 April 2009	33	30	28	51	53	51	31	54	46	32
7 April 2009	34	30	-	52	52	53	-	51	48	-
Rating Background Level/Median	32	30	27	51	50	53	34	47	44	34

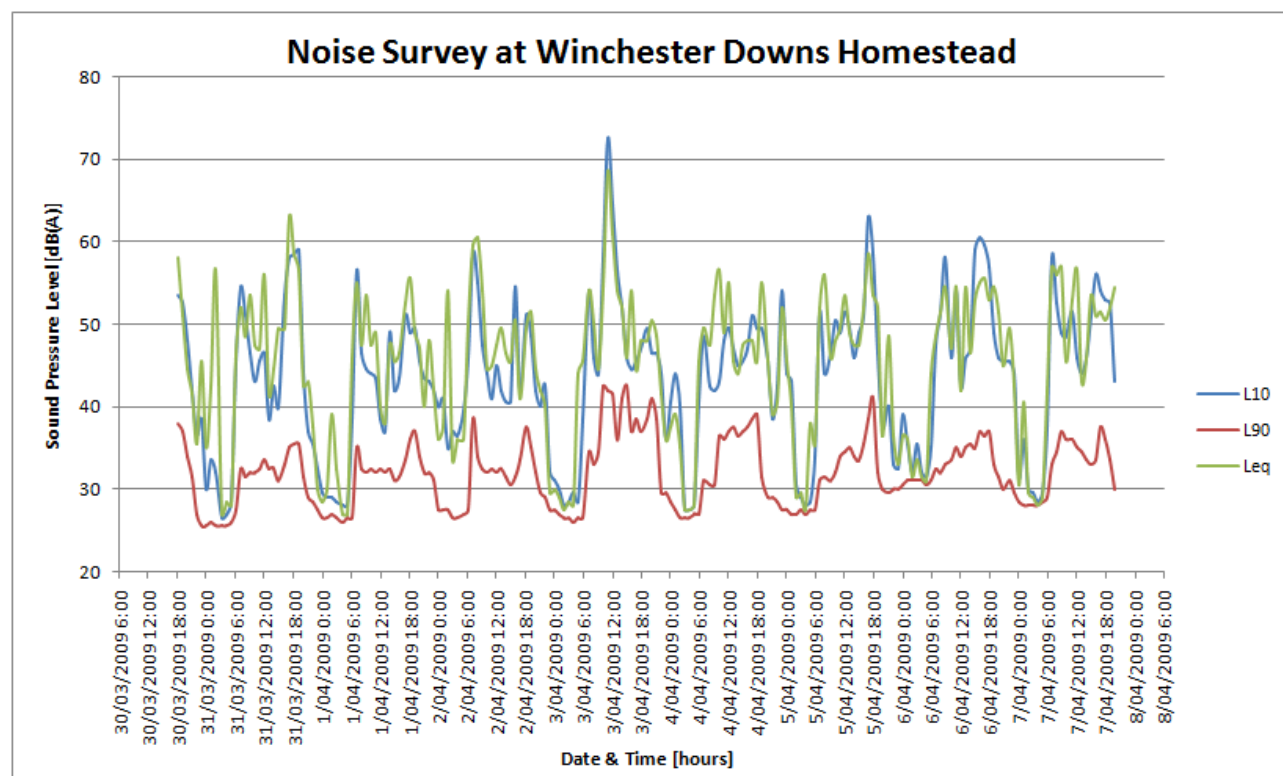


Figure 7: Noise Measurements At Winchester Downs Homestead from 2009

6 Conclusions

A noise survey has been conducted at Winchester Downs Homestead in accordance with the methodology described in the Department of Environment and Science Noise Measurement Manual V4.01.

The noise measurements were conducted over a two-week period in July 2025. The noise measurements were unattended using a Type 1 Norsonic NOR 139 sound level meter. The weather during the period was ideal with only a few short periods excluded for winds slightly more than the threshold values. Potentially high winds lead to buffering on the microphone and high noise levels.

Several attended noise level measurements were obtained during the evening and the night. The measurements revealed that during the early evening the noise was dominated by insect noise. During the night period and after the insect and other local noises abated a low-level industrial noise was evident. The noise was not intrusive, nor included any unusual characteristics. It represents existing industrial noise during selected times and meteorological conditions.

This report includes measurements obtained at Winchester Downs since 2006. It is noted that the background (L_{A90}) noise levels have remained consistent over the period. The minor changes are due to the improved instrumentation used in contemporary noise surveys and seasonal matters. In 2009 the day background noise levels were slightly higher. Since it was obtained in early April it is likely to represent increased human activity and noise from insects, cattle and wildlife. The L_{Aeq} noise levels are quite low in the most recent noise survey. Typically, L_{Aeq} noise levels are biased towards high noise level events. It is likely there was minimal local activities influencing the noise i.e. the earlier measurements were obtained closer to the homestead and the various noise producing activities.

Appendix B. Meteorological conditions

Predicted wind roses were supplied by the air quality consultant Katestone Environmental Australia (Isaac Downs Extension: Air Quality Assessment, January 2026) and are reproduced below.

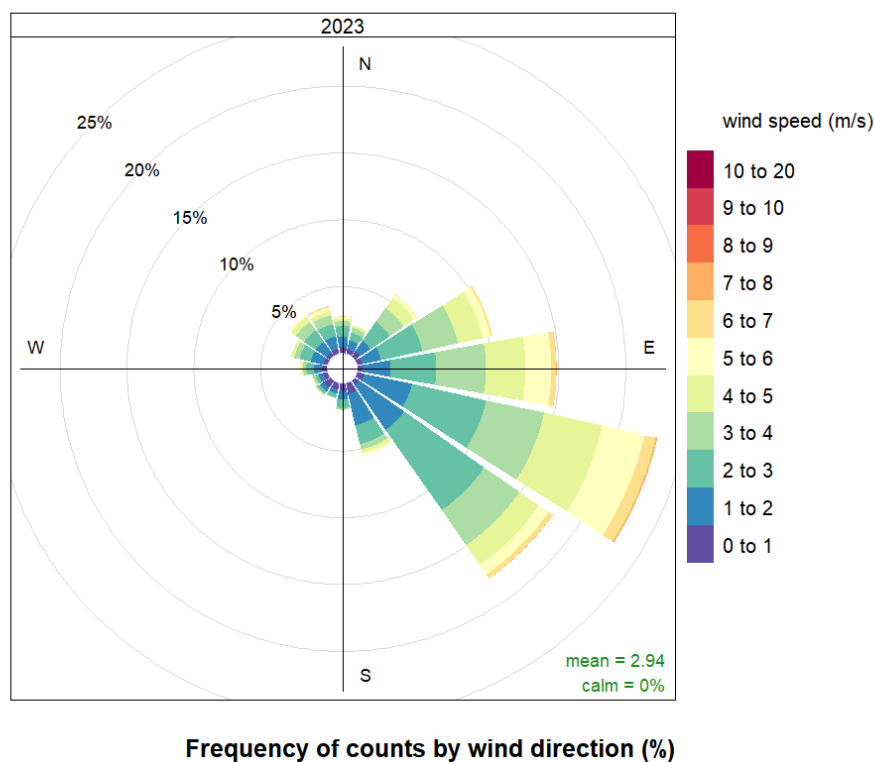
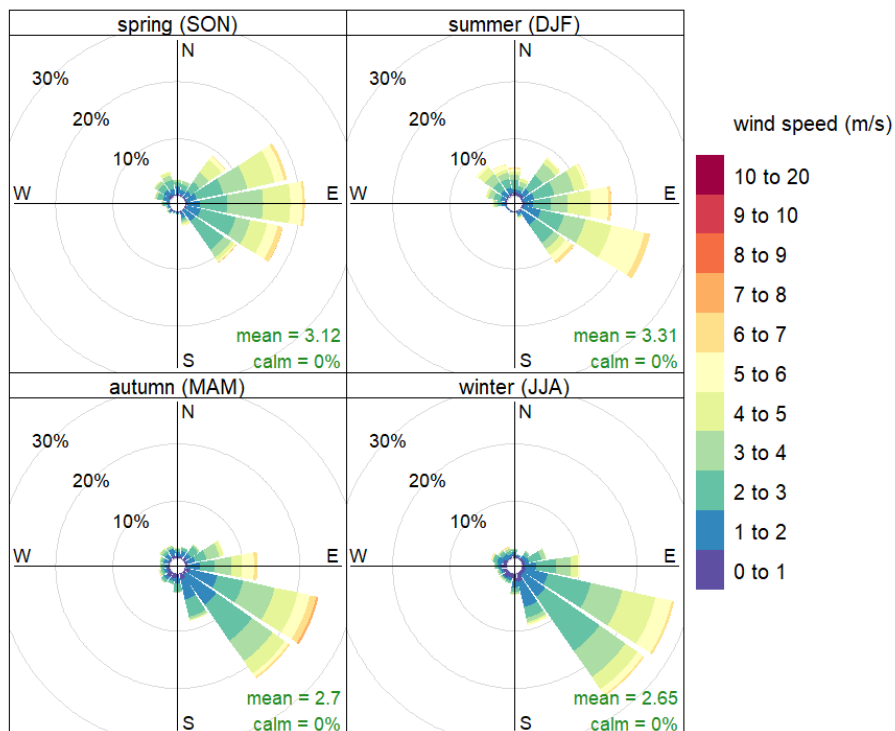
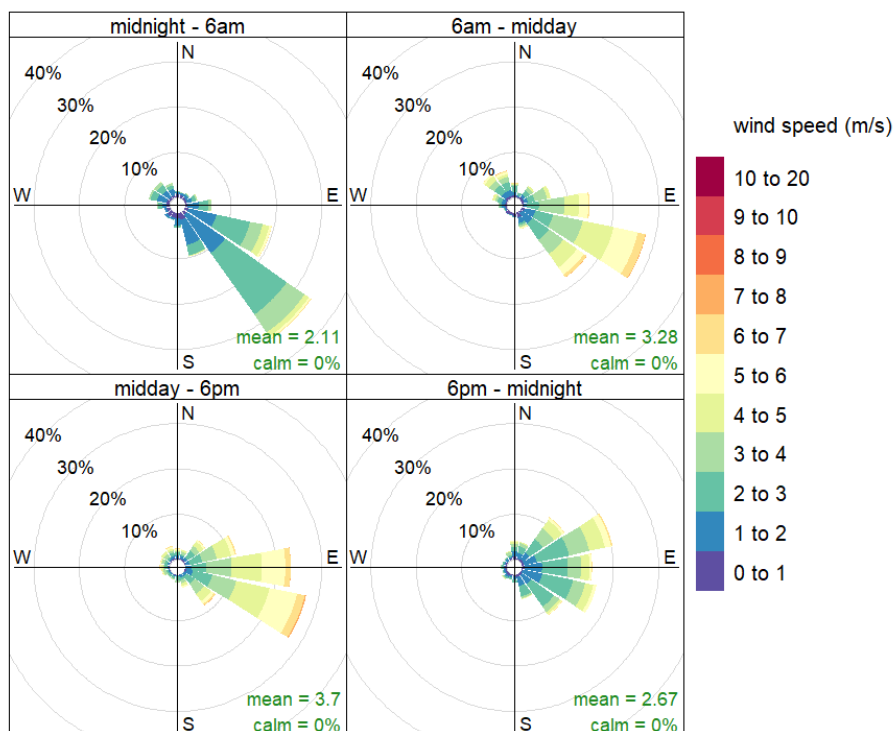


Figure 7 - Annual wind roses for the Project site



Frequency of counts by wind direction (%)

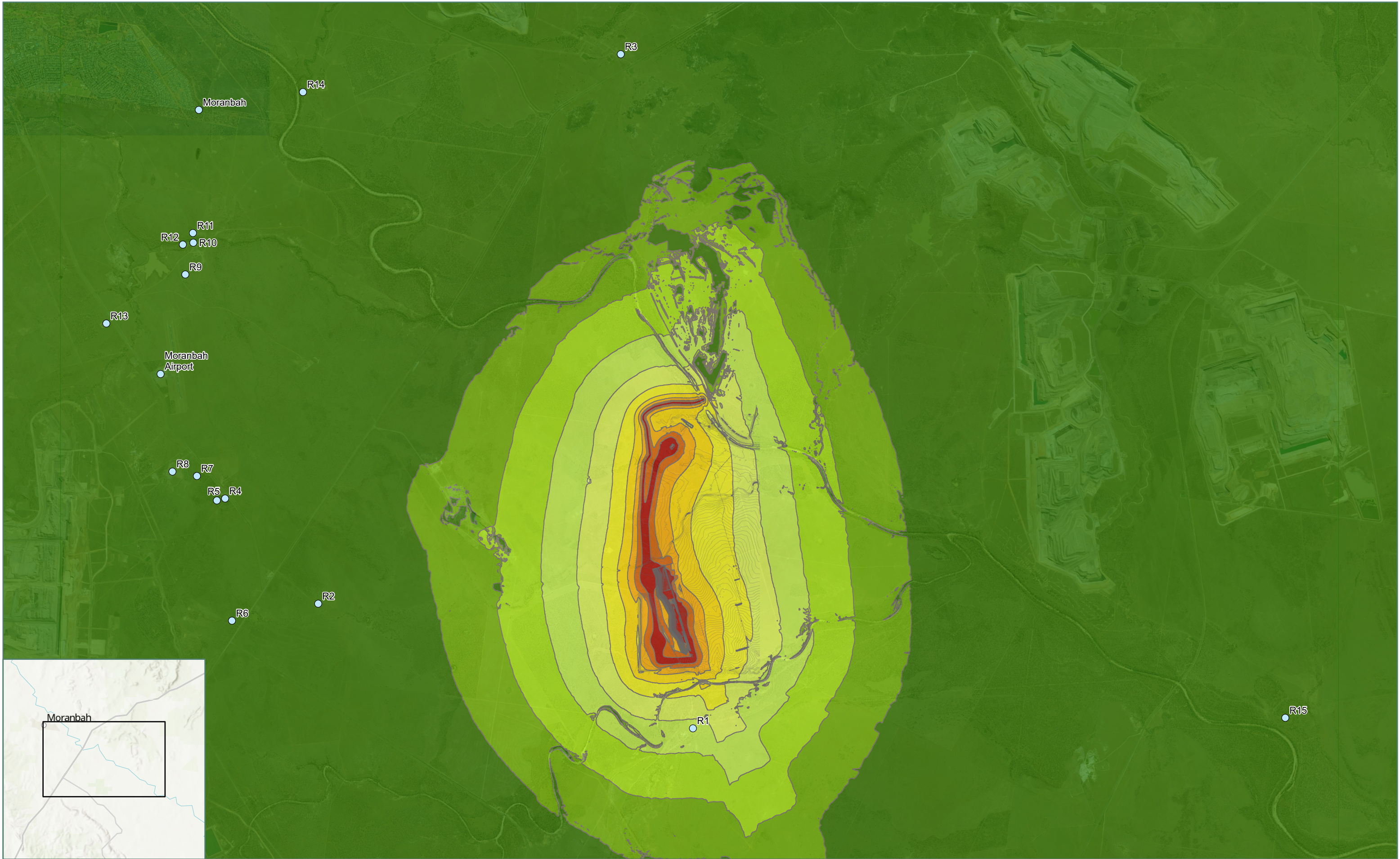
Figure 8 - Seasonal wind roses for the Project site



Frequency of counts by wind direction (%)

Figure 9 - Diurnal wind roses for the Project site

Appendix C. Noise contour maps





N



0 500 1,000 1,500 2,000



Meters

Legend

L_{Aeq,1hr} dB(A)

	≥ 60 dB
	55 to 60 dB
	50 to 55 dB
	45 to 50 dB
	40 to 45 dB

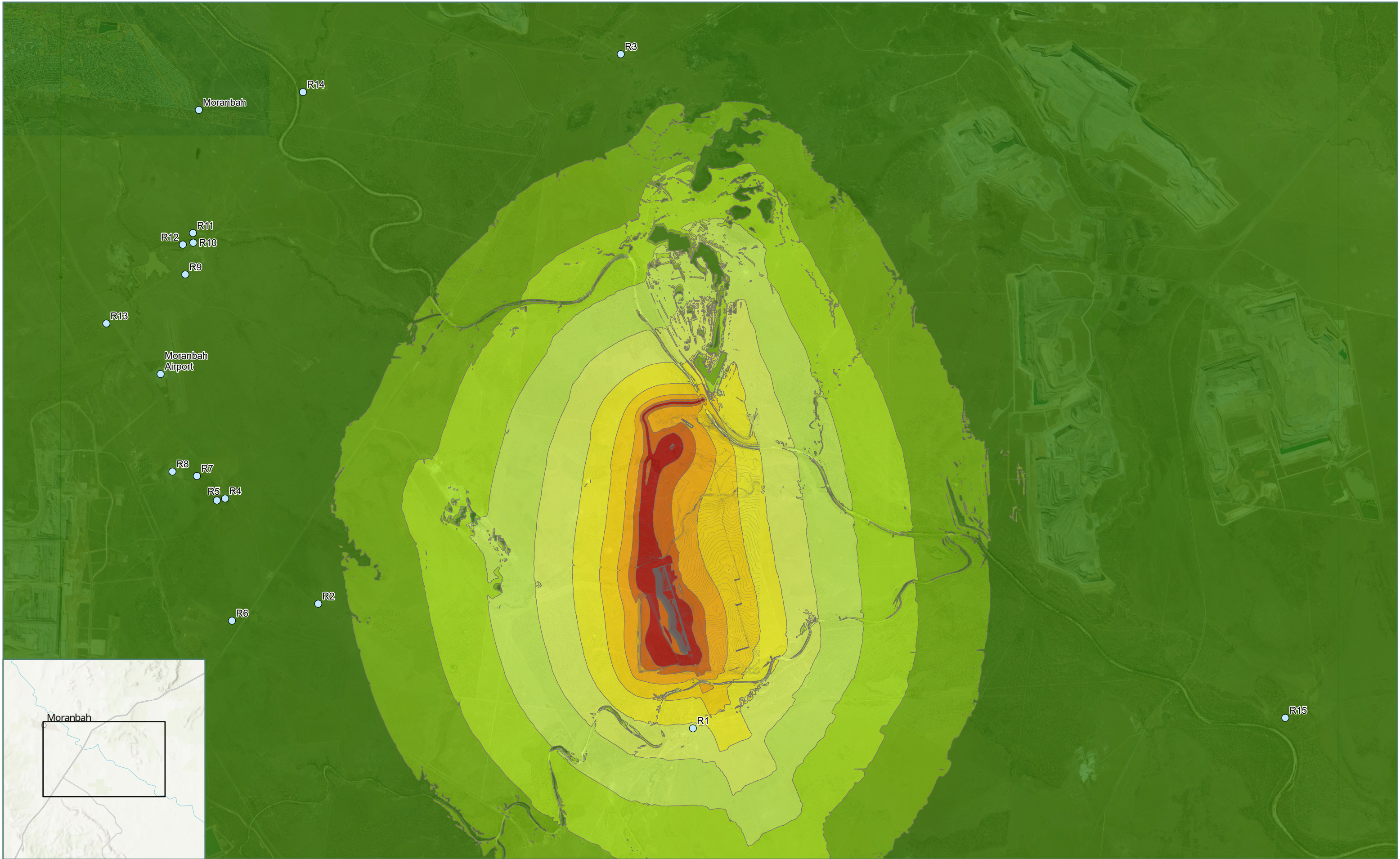
	35 to 40 dB
	30 to 35 dB
	25 to 30 dB
	20 to 25 dB
	≤ 20 dB

Receptors

 Residential

Predicted L_{Aeq,1hr} noise levels for the year 2029 under neutral weather conditions

Appendix C1





N



0 500 1,000 1,500 2,000



Meters

Legend

L_{Aeq,adj,1hr} dB(A)

	≥ 60 dB
	55 to 60 dB
	50 to 55 dB
	45 to 50 dB
	40 to 45 dB

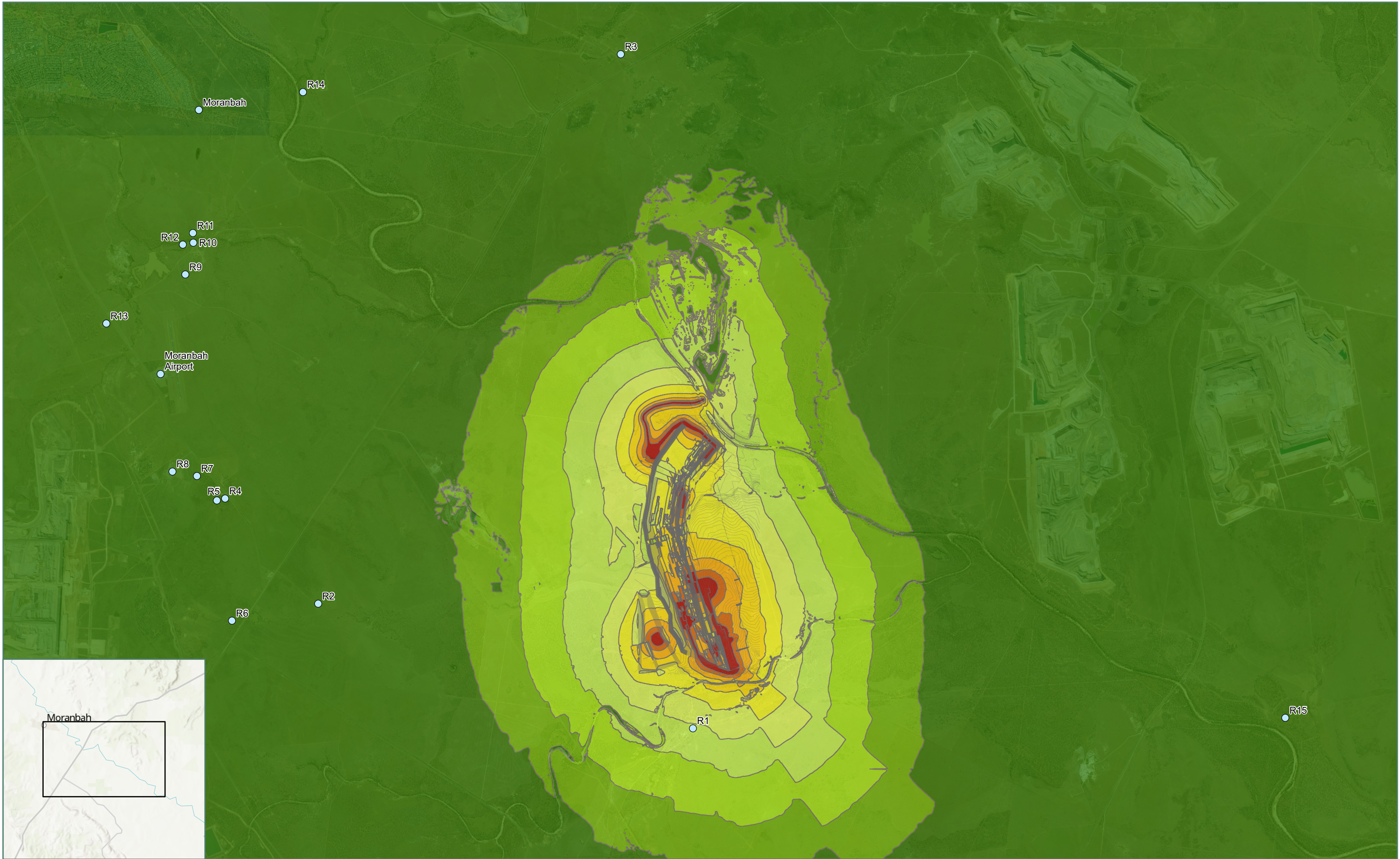
Receptors

 Residential

	35 to 40 dB
	30 to 35 dB
	25 to 30 dB
	20 to 25 dB
	≤ 20 dB

Predicted L_{Aeq,1hr} noise levels for the year 2029 under adverse weather conditions

Appendix C2





N



0 500 1,000 1,500 2,000

Meters

Legend

L_{Aeq,adj,1hr} dB(A)

≥ 60 dB

55 to 60 dB

50 to 55 dB

45 to 50 dB

40 to 45 dB

35 to 40 dB

30 to 35 dB

25 to 30 dB

20 to 25 dB

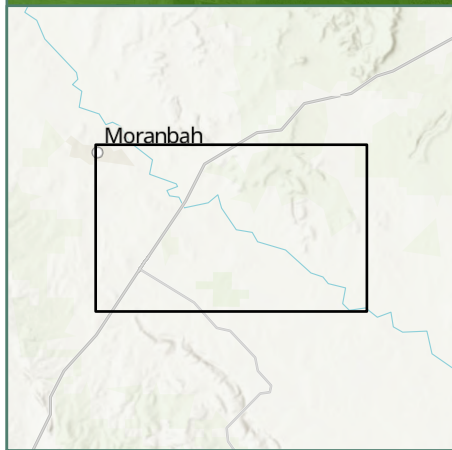
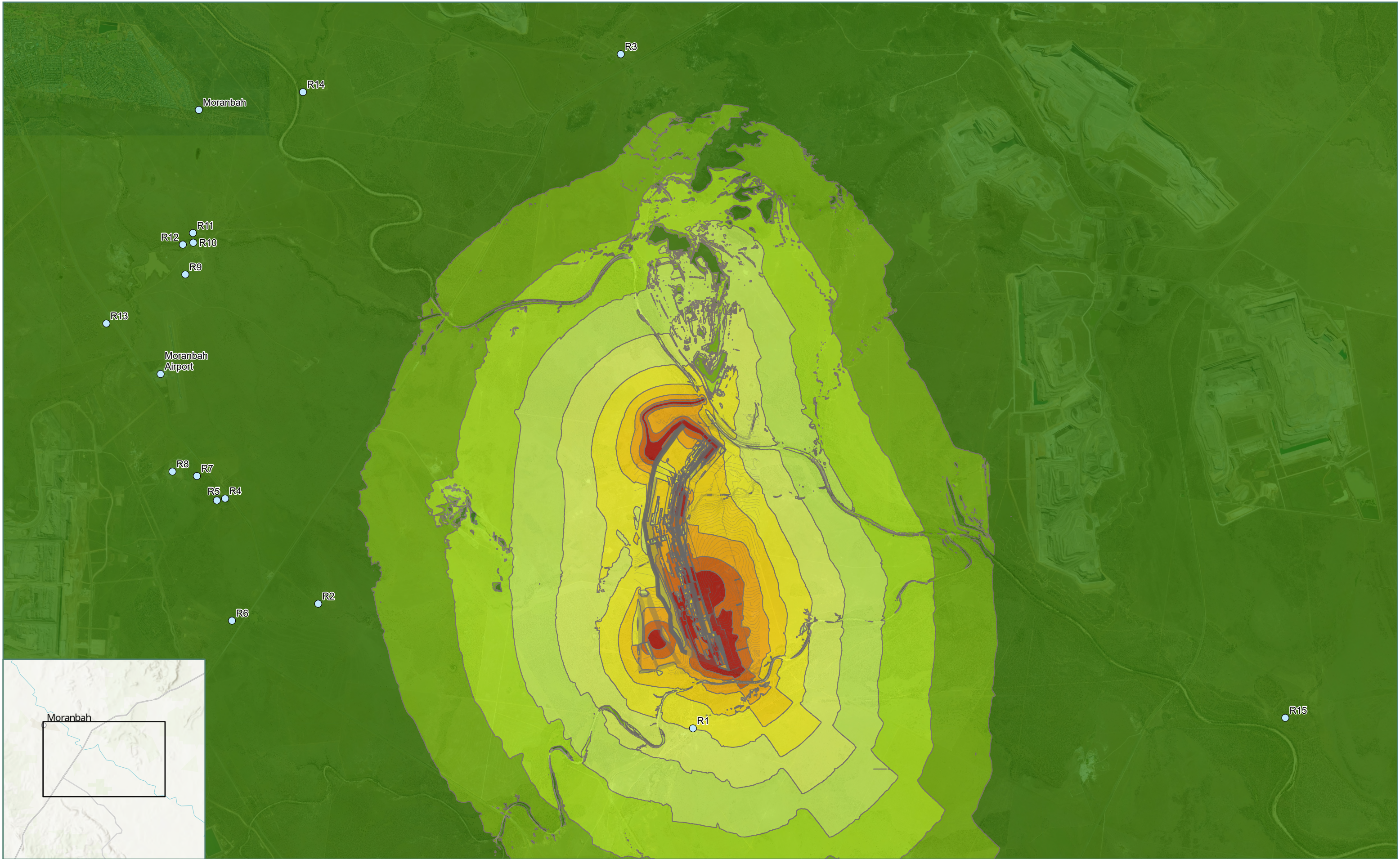
≤ 20 dB

Receptors

Residential

Predicted L_{Aeq,1hr} noise levels for the year 2034 under neutral weather conditions

Appendix C3





Legend

L_{Aeq,adj,1hr} dB(A)

	≥ 60 dB
	55 to 60 dB
	50 to 55 dB
	45 to 50 dB
	40 to 45 dB

Receptors

 Residential

	35 to 40 dB
	30 to 35 dB
	25 to 30 dB
	20 to 25 dB
	≤ 20 dB

Predicted L_{Aeq,1hr} noise levels for the year 2034 under adverse weather conditions

Appendix C4





N



05001,0001,5002,000

Meters

Legend

L_{Aeq,adj,1hr} dB(A)

≥ 60 dB

55 to 60 dB

50 to 55 dB

45 to 50 dB

40 to 45 dB

35 to 40 dB

30 to 35 dB

25 to 30 dB

20 to 25 dB

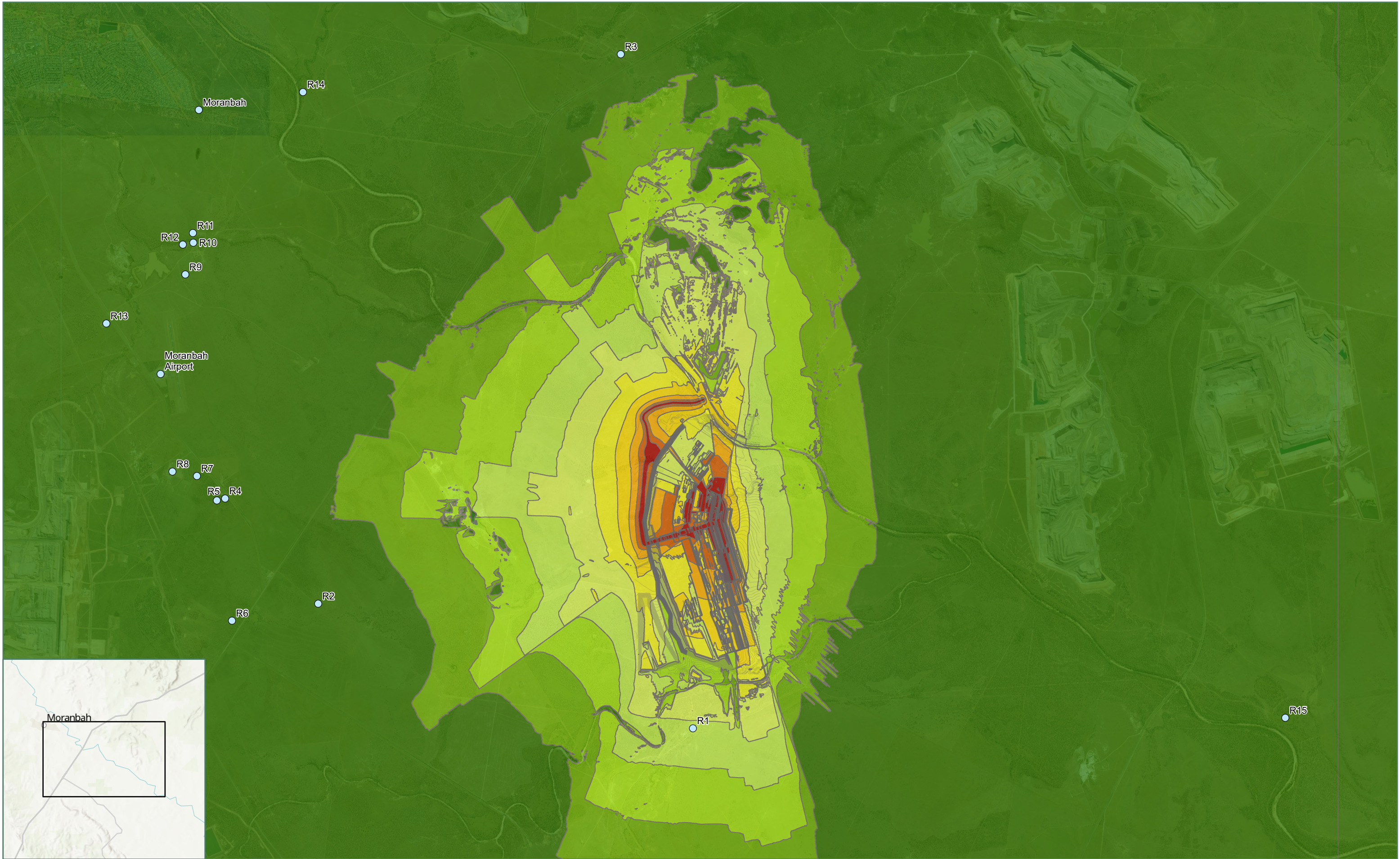
≤ 20 dB

Receptors

 Residential

Predicted L_{Aeq,1hr} noise levels for the year 2042 under neutral weather conditions

Appendix C5





N



0 500 1,000 1,500 2,000



Meters

Legend

$L_{Aeq,1hr}$ dB(A)

 ≥ 60 dB	 35 to 40 dB
 55 to 60 dB	 30 to 35 dB
 50 to 55 dB	 25 to 30 dB
 45 to 50 dB	 20 to 25 dB
 40 to 45 dB	 ≤ 20 dB

Receptors

 Residential

Predicted $L_{Aeq,1hr}$ noise levels for the year 2042 under adverse weather conditions

Appendix C6