Appendix 65 Pinjarra Alumina Refinery Revised Proposal Noise Assessment for Huntly Mine – Myara North and Holyoake

wood.

Alcoa of Australia Limited

PINJARRA ALUMINA REFINERY REVISED PROPOSAL

Noise Assessment for Huntly Mine – Myara North and Holyoake

GHD

Rpt01-AU00028-Rev2-08 Sept 2021

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Customer: **GHD**

Customer Contact: Heath Morgan

Wood Contact: Phang Kit Lim

Wood Office: Perth

Wood Job No: AU00028

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EXECUTIVE SUMMARY

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Mine (the Mine) to the proposed Myara North and Holyoake mine regions. The Proposal is located in the Peel Region of Western Australia (WA), approximately 100 km southeast of Perth. The Mine is located predominantly within the Shires of Murray, Serpentine-Jarrahdale and Boddington within the Peel Region of Western Australia. The proposed Myara North mine region is southeast of the town of Jarrahdale and the proposed Holyoake mine region is east of Dwellingup.

The Proposal will be subject to environmental impact assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). The environmental impact assessment will be via a Public Environmental Review (PER).

Wood has been engaged by GHD, on behalf of Alcoa, to undertake a noise assessment of the Proposal to support the PER. This report presents the noise assessment for the Mine component of the Proposal, which involves a transition of mining into the proposed Myara North and Holyoake regions.

The noise assessment includes modelling and assessment of noise emissions from operational equipment within the proposed Myara North and Holyoake Mine regions. The outcomes of the modelling are used to ascertain the risk of exceedance of the Assigned Levels, as defined in the Environmental Protection (Noise) Regulations 1997 (the Regulations) at identified Noise Sensitive Receptors (NSRs) located in and around the proposed Myara North and Holyoake mine regions. The assessment also includes assessment of blasting activities to determine potential blast noise and ground borne vibration impacts at the NSRs.

The results of the assessment indicate that daytime noise emissions are unlikely to exceed the daytime Assigned Levels for mining operations for the proposed Myara North and Holyoake mine regions. The highest predicted noise levels for night-time operations have identified the potential for exceedance of the night-time Assigned Levels at some NSRs for certain mine operations and under adverse weather conditions for noise propagation in both proposed mine regions.

Operational Noise Impacts

During operational years when mining, pit construction and rehabilitation activities are being conducted simultaneously in close proximity, the following NSRs in the proposed Myara North mine region could be subject to exceedance of the night-time Assigned Levels if activities are carried out without appropriate noise management:

- NSR 15 (rural property on Balmoral Road, approximately 6 km from Jarrahdale); and
- NSR 25 (Wungong Campsite on the Munda Biddi Trail).

The predicted model results for the proposed Myara North region, indicate that Assigned Levels are unlikely to be exceeded at NSRs in the Jarrahdale townsite (represented by NSRs 4, 5 20 and 21).

For the proposed Holyoake region, without appropriate noise management, the highest predicted noise levels suggest a potential exceedance of the night-time Assigned Levels at:

- H[1]-NSRs 1 – 11 (rural properties at Inglehope, along Pinjarra-Williams Road & McRae Road), and
- H-NSR 36 (Etmilyn Trail Rail Siding).

The noise assessment for the proposed Holyoake region indicates that Assigned Levels are unlikely to be exceeded at the following NSRs in:

- the townsite of Dwellingup; and
- at H-NSR 16 – 24 (rural properties along Pinjarra-Williams Road).

Audibility

The highest predicted noise levels at the individual NSRs have been compared against monitored ambient baseline noise levels to identify the potential for audibility of mining noise at these receivers. The exercise indicates that operational noise from Myara North's mine operation is expected to be audible at the following NSRs:

- NSR 14 (rural property on Balmoral Road);
- NSR 23 (Monadnocks campsite on the Bibbulmun Track);
- NSR 24 (Mt Cooke campsite on Bibbulmun Track); and
- NSR 25 (Wungong campsite on the Munda Biddi Trail).

Audibility is expected to be limited to adverse meteorological conditions for sound propagation to the receivers and certain mine operations.

For the proposed Holyoake mine region, comparing predicted noise levels against monitored ambient baseline noise indicates that operational mining noise is expected to be audible at the following NSRs:

- H-NSR 4, 10, 13 (comprising rural properties at Inglehope); and
- H-NSR 36 – 38 (Etmilyn Trail Rail Siding, Inglehope Shelter and Chadora campsite).

[1] H -prefix indicates the noise sensitive receivers are located within the Holyoake mine region. NSRs without the H-prefix indicate NSRs located within the Myara North mining region

Audibility assessments indicate that operational mining noise is unlikely to be audible at the following NSRs:

- The townsite of Jarrahdale (northwest of the Myara North mine region);
- H-NSRs 39 – 41 (comprising the Swamp Oak, Mt Wells and White Horse Hills campsites) at the Holyoake mine region; and
- The townsite of Dwellingup and at properties H-NSR 16 – 24 along Pinjarra-William Road, or at campsites within Lane Poole Reserve (at the Holyoake mine region).

Historical Weather Trend

Analysis of historical weather data from the Bureau of Meteorology's (BoM) Dwellingup station between 1 January 2016 and 31 December 2020, indicates that adverse meteorological conditions for noise propagation similar to the EPA Default Weather criteria persist for only 10 per cent of the total time in a given year for winds prevailing in the direction of Myara North's NSRs, which are predominantly to the west of the proposed mine operations. These adverse weather conditions for noise propagation persists for an even lower time (1 per cent) in a given year for winds prevailing in the directions of Holyoake's NSRs, which are predominantly to the south and south-west of the proposed mine operations.

Practicality of Modelling Methodology

Predicted exceedances are an artefact of a worst-case modelling assessment methodology which has been adopted to identify the potential risks of exceedance rather than to forecast the occurrence of actual exceedances. Mining activities are fluid and mobile in nature and it is fully expected that noise management practices currently utilised by Alcoa at its Myara mine (which includes short term operational noise modelling and, where required, noise monitoring) will be capable of alleviating the risk of exceeding the Assigned Levels at the nearby noise sensitive receivers within the proposed Myara North and Holyoake mine regions.

Tonality Impacts

As the dominant sources affecting NSRs are primarily emissions from mining mobile equipment (i.e. haul trucks, excavators, etc - which will have some element of tonality), Wood also undertook an assessment for the risk of exceedance due to tonality. As it is impractical to predict tonality (due to tonal noise not being always evident at the receiver because of background masking and other factors), predicted noise levels within 5 dB of the Assigned Levels have been flagged as a risk of exceedance if tonality is present.

The inclusion of tonality indicates that the following NSRs across both the proposed Myara North and Holyoake mine region may be subject to an exceedance of Assigned Levels if tonality is present:

- Myara North
    - NSR 11-15 (rural properties along Balmoral Road);

  - NSR 23 (Monadnocks campsite on the Bibbulmun Track); and
  - NSR 25 (Wungong campsite).

- Holyoake
  - H-NSRs 1-14 (rural properties at Inglehope);
  - H-NSR 36 (Etmilyn Trail Rail Siding); and
  - H-NSR 38 (Chadora campsite on Bibbulmun Track).

Blast Noise Impacts

Blast noise measurements at Alcoa's current Huntly mine operations in the Myara region indicate that a radius of 1.2 km will be required for the blast overpressure to attenuate below the 120 dB(L) maximum limit prescribed by the Regulations for residential receivers (including the recreational campsites).

The proposed Myara North and Holyoake regions have a number of indicative mine pits (shown in Section 7.2) located within this 1.2 km radius. Alternative caprock breaking methods, such as stemming practices and mechanical fracturing, will need to be considered in these areas. In line with the current Huntly mine operations, Alcoa is committed to establishing a 650 m safety exclusion zone around all blast locations.

Blast Vibration Impacts

Based on calculation of the ground borne vibration levels from 9 kg and 7 kg maximum instantaneous blast charges from Alcoa's current Huntly Mine at the Myara region, the distances for ground borne vibration to attenuate to below the 5mm/s criteria level for building damage are 212 m and 188 m respectively. Therefore, ground borne vibration levels are not expected to be significant for any NSRs (including recreational campsites) within the proposed Myara North and Holyoake mine regions.

Conclusion

Noise emissions associated with mining activities at the Myara North and Holyoake regions can be effectively managed through the implementation of noise controls and operational planning practices to minimise noise impacts and to achieve compliance with the Assigned Levels and regulatory blast noise limits.

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1 INTRODUCTION

Alcoa of Australia Limited (Alcoa) is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Mine (Mine) to the proposed Myara North and Holyoake mine regions. The proposed development is located in the Peel Region of Western Australia (WA), approximately 100 km southeast of Perth. The Mine is located predominantly within the Shires of Murray, Serpentine-Jarrahdale and Boddington within the Peel Region of Western Australia. The proposed Myara North mine region is southeast of the town of Jarrahdale and the proposed Holyoake mine region is east of Dwellingup.

The Proposal will be subject to environmental impact assessment under Part IV of the WA *Environmental Protection Act 1986* (EP Act), and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). The environmental impact assessment will be via a Public Environmental Review (PER).

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1.1 Myara North

The proposed transition of the Mine into the Myara North mine region requires new conveyors and/or haul roads and the development of new mine facilities. Long haul trucking is proposed in the first 18-24 months prior to installation of any conveyor infrastructure. There is a potential to utilise long haul trucking for the duration of the life of Myara North mine region, with the final decision subject to engineering studies. For the purposes of this assessment, the transport of ore and facilities comprise:

- Development of haul routes for long haul ore trucking back to the current Myara mine ore handling facilities while the overland conveyors are being constructed;
- Construction of 2 new overland conveyors (OLC1 & 2A) approximately 18.5 km in total from new mine facilities proposed within Myara North, to a tie-in with the existing conveyor in the Myara region, feeding Alcoa's Pinjarra Alumina Refinery;

- Construction of 2 new transfer stations at the tail end of each new overland conveyor;
- Construction of crushing/sizing facilities at the new mine facilities at Myara North, including retaining walls, tip circle, provision for ROM stockpile area and relocation of a crusher /conveyor transfer station and ancillary equipment;
- Construction of a facilities area at Myara North containing offices, heavy and light vehicle washdown, haul truck and heavy equipment park-up area, sewage treatment plant, waste water treatment plant, potable water treatment plant, heavy vehicle/ light vehicle fuel and service facilities and contractors yard;
- Construction of infrastructure including a reservoir, stormwater drainage capture and re-use and sewerage, electrical substations and reticulation, communications network, water supply and distribution, roads and carparks;
- Construction of heavy vehicle and light vehicle access roads; and
- Mining of bauxite ore over a Development Envelope (DE) involving a mobile mining fleet of excavators, loaders, haul trucks and other equipment.

Alcoa intends to begin construction and development activities in the proposed Myara North mine region from around 2023, on receipt of relevant approvals.

Figure 1-1 shows the proposed Myara North mine region DE, location of the fixed infrastructure area, the potential new overland conveyor with a tie-in at the existing Myara overland conveyor and indicative haul route.

Figure 1-2 shows an indicative layout of the proposed Myara North mine facilities, which would be similar in scale and operation to the existing Myara region mine facilities.

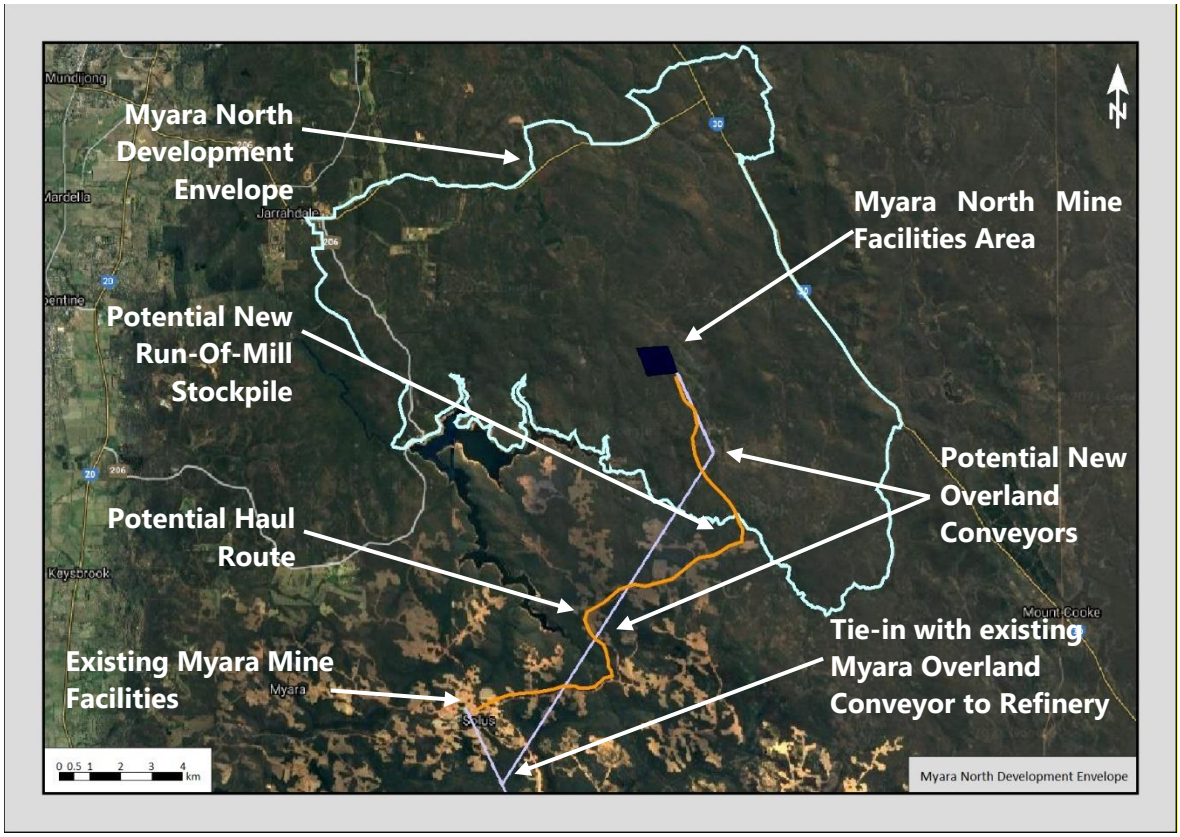


Figure 1-1 : Proposed Myara North Development Envelope, Indicative Facilities Area, Potential Conveyor and Haul Route

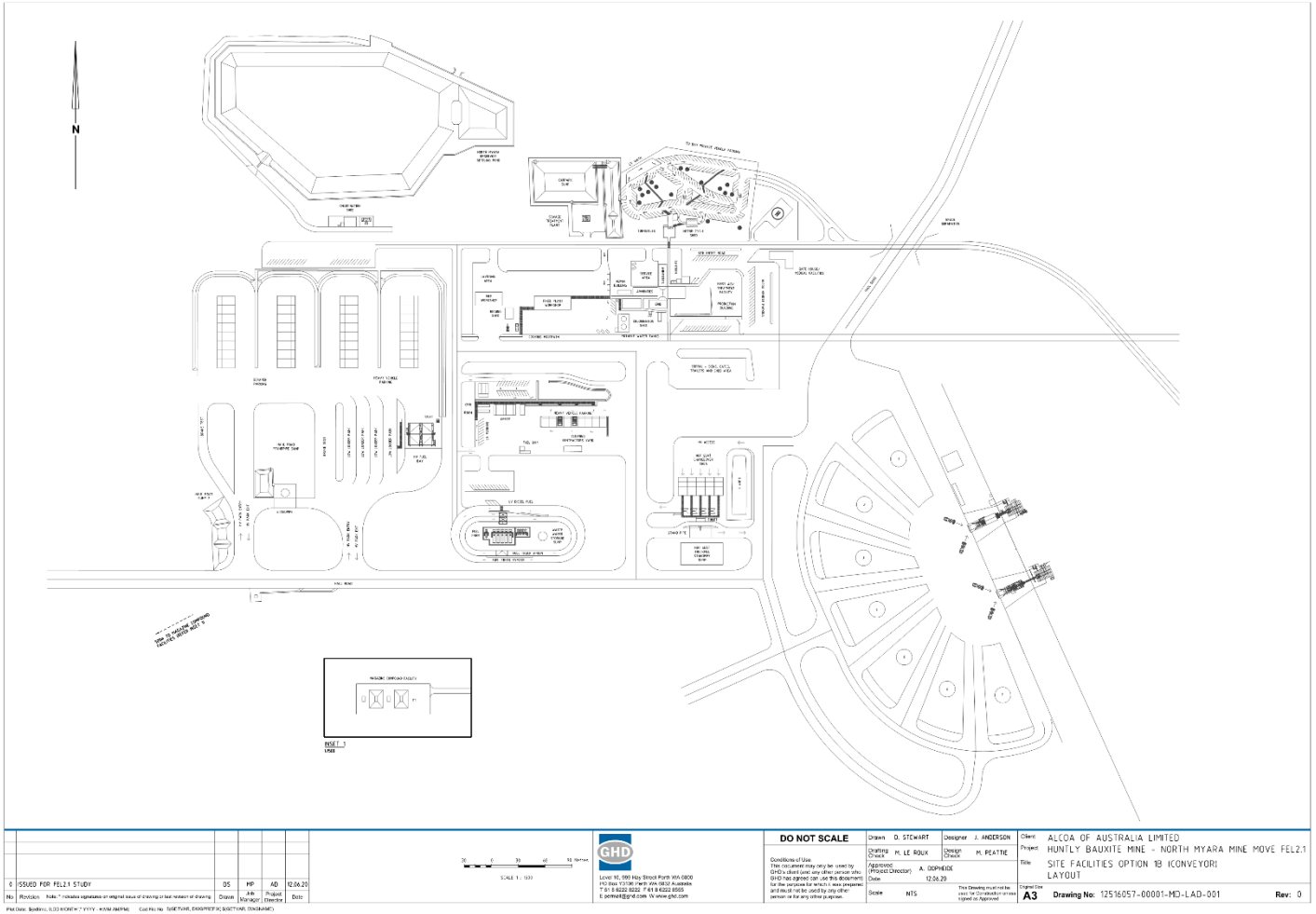


Figure 1-2 : Proposed Myara North Mine Facilities Area – Indicative Layout

1.2 Holyoake

The proposed Holyoake mine region is currently in the exploration phase. At this point, the mine plan is expected to be developed in the coming years post completion of exploration. Bauxite mining in the proposed Holyoake region is currently planned to commence about 2030 (subject to approvals and final mine planning) with developmental/construction activities to commence approximately 2 years prior. For the proposed Holyoake region, assessments have been conducted based on currently available concepts.

The proposed Holyoake region is expected to involve a new mine facilities area and overland conveyors, with conveyors connecting to a tie-in at the existing conveyor in the historic White Road mine region (see Figure 1-3).

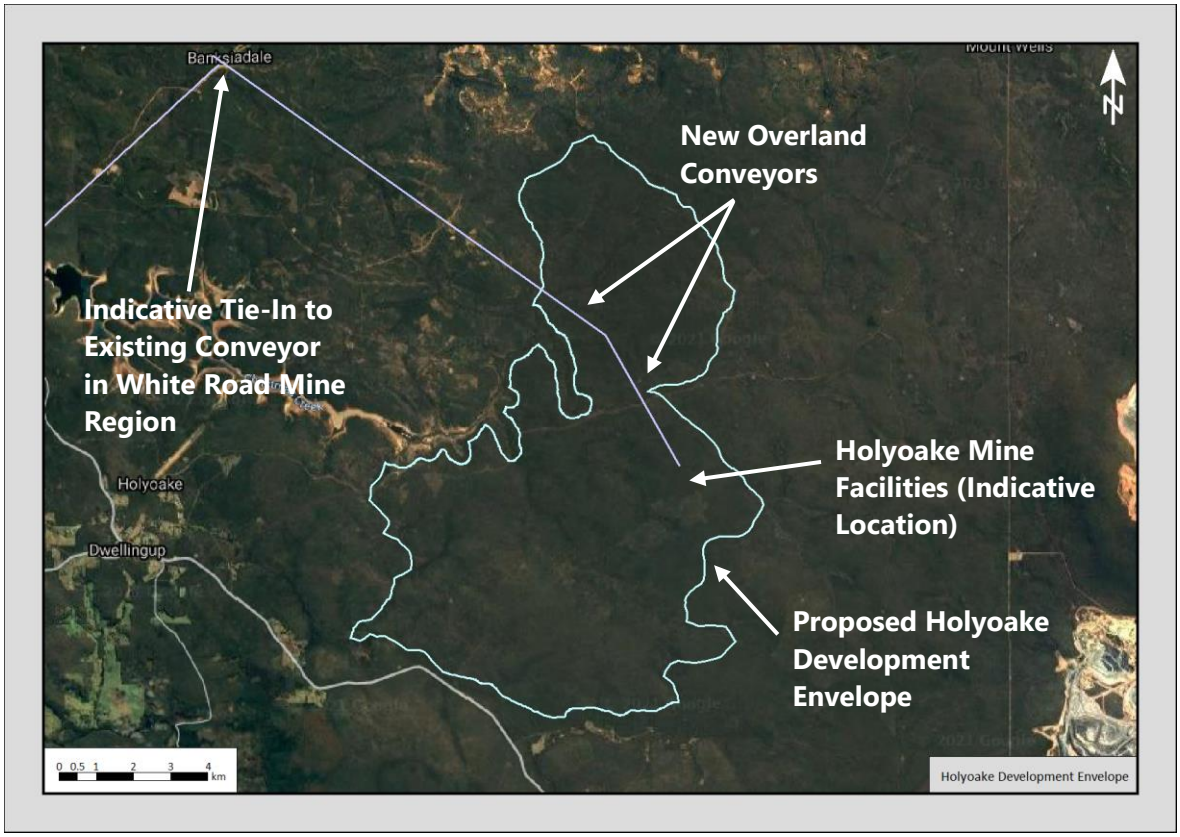


Figure 1-3 : Proposed Holyoake Development Envelope, Tie-In to Existing Conveyor, Potential Conveyor Route and Indicative Location of New Mine Facilities

1.3 Noise Objectives

Alcoa's noise objectives for the Proposal are:

- to ensure that noise emissions associated with mine development, operations and rehabilitation for the proposed mine regions do not contribute to exceedances of the

Assigned Levels prescribed by the Environmental Protection (Noise) Regulations 1997, at nearby noise sensitive receivers; and

- to manage noise emissions to minimise amenity impacts during exempt activities (i.e. construction noise).

1.4 Objectives and Scope of Assessment

1.4.1 Assessment Objectives

The objectives of this assessment are:

- to quantify the predicted noise levels associated with the proposed Myara North and Holyoake mine regions;
- to assess predicted noise levels against the Assigned Levels specified by the Environmental Protection (Noise) Regulations 1997 at identified NSRs;
- to quantify the anticipated air blast overpressure and ground borne vibration levels from blasting activities carried out within the proposed Myara North and Holyoake mining regions; and
- to assess the predicted air blast overpressure levels against levels specified within Section 11 of the Environmental Protection (Noise) Regulations 1997;
- to assess the predicted ground borne vibration levels against ground borne vibration blast design avoidance criteria for damage to property recommended in APPENDIX J of Australian Standard (AS) 2187.2: Explosives – Storage, Transport & Use; Part 2: Use of Explosives; and
- where appropriate, to identify noise mitigation measures to achieve compliance with the noise objectives for the Myara North and Holyoake mine regions.

1.4.2 Scope of Assessment

This assessment addresses noise associated with the mine development, operations, and rehabilitation[2] phases of the Myara North and Holyoake mine regions. Fixed plant construction noise impacts are excluded.

[2] Mine Pit development refers to pit clearing and blasting activities while mining operations refers to the actual mining activities carried out within the pit. Typically, pit clearing would be classified as construction noise. However, given the size of the mining area and the progressive nature of clearing activities, a finite 'construction period' does not exist and clearing is, therefore, considered as part of normal operations. For the purposes of this assessment, construction noise is limited to noise emissions generated from the construction activities associated with the new mine facilities and has been excluded from the modelling and assessment.

1.5 Applicable Documents

The following documents are relevant to this assessment:

- Environmental Protection Act 1986;
- Environmental Protection (Noise) Regulations 1997; and
- Draft Guideline: Assessment of Environmental Noise Emissions, Department of Water and Environmental Regulation, May 2021 .

2 SUMMARY OF RELEVANT LEGISLATION

2.1 Environmental Protection (Noise) Regulations 1997

Noise management in Western Australia is implemented through the Environmental Protection (Noise) Regulations 1997 (the regulations) which operate under the *Environmental Protection Act 1986*. The Regulations specify maximum noise levels (Assigned Levels) which are the highest noise levels that can be received at noise-sensitive premises, commercial and industrial premises. Table 2-1 presents the Assigned Levels.

Assigned Levels have been set differently for noise sensitive premises, commercial premises, and industrial premises. For noise sensitive premises, e.g. residences, an "influencing factor" is incorporated into the Assigned Levels. The influencing factor depends on land use zonings within circles of 100 m and 450 m radius from the noise receiver, including:

- the proportion of industrial land use zonings;
- the proportion of commercial zonings; and
- the presence of major or secondary roads.

For noise sensitive residences, the time of day also affects the Assigned Levels.

The regulations define three types of Assigned Level:

- L_{Amax} Assigned Level means a noise level which is not to be exceeded at any time;
- L_{A1} Assigned Level which is not to be exceeded for more than 1% of the time; and
- L_{A10} Assigned Level which is not to be exceeded for more than 10% of the time.

The L_{A10} noise limit is the most significant for this study since this is representative of continuous noise emissions from mining operations.

Table 2-1 : Assigned Levels

Type of premises receiving noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday	45 + Influencing factor	55 + Influencing factor	65 + Influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + Influencing factor	50 + Influencing factor	65 + Influencing factor
	1900 to 2200 hours all days	40 + Influencing factor	50 + Influencing factor	55 + Influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + Influencing factor	45 + Influencing factor	55 + Influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial premises	All hours	65	80	90

2.2 Assigned Levels for Selected Receptors

Twenty five (25) and forty one (41) representative NSR locations surrounding the proposed Myara North and Holyoake mine respectively have been identified (refer to Figure 2-1 and Figure 2-2.). The NSRs primarily comprise residential properties as well as a number of recreational campsites where people may be resting/ sleeping/ camping during night-time periods when conditions are most conducive for noise propagation.

The NSRs were identified in consultation with Alcoa and through review of aerial imagery, land use zoning, and Department of Biodiversity, Conservation and Attractions (DBCA) recreational facility data.

Table 2-2 : NSRs Within and Surrounding the Myara North and Holyoake Mine Regions

NSR ID	Description
NSR 1	Serpentine Café on the Dam (includes onsite Ranger residence)
NSR 2, 3, 6 – 15	Rural properties along Balmoral Road and Kingsbury Drive
NSR 4, 5, 16 - 22	Residential properties on eastern border of Jarrahdale townsite
NSR 23 & 24	Monadnocks and Mt Cooke campsites along Bibbulmun Track
NSR 25	Wungong campsite on Munda Biddi Trail
H-NSR 1 - 15	Rural properties at Inglehope, along McRae Road and Pinjarra Williams Road
H-NSR 16 - 24	Rural properties along Pinjarra Williams Road on the south western flank of the Holyoake Mine Region Development Envelope
H-NSR 25 - 35	Rural properties approximately 2.5 km East South-East from Dwellingup townsite
H-NSR 36	Etmilyn Trail Rail Siding
H-NSR 37	Inglehope shelter/ campsite
H-NSR 38	Chadora campsite
H-NSR 39	Swamp Oak campsite
H-NSR 40	Mt Wells campsite
H-NSR-41	White Horse Hills campsite

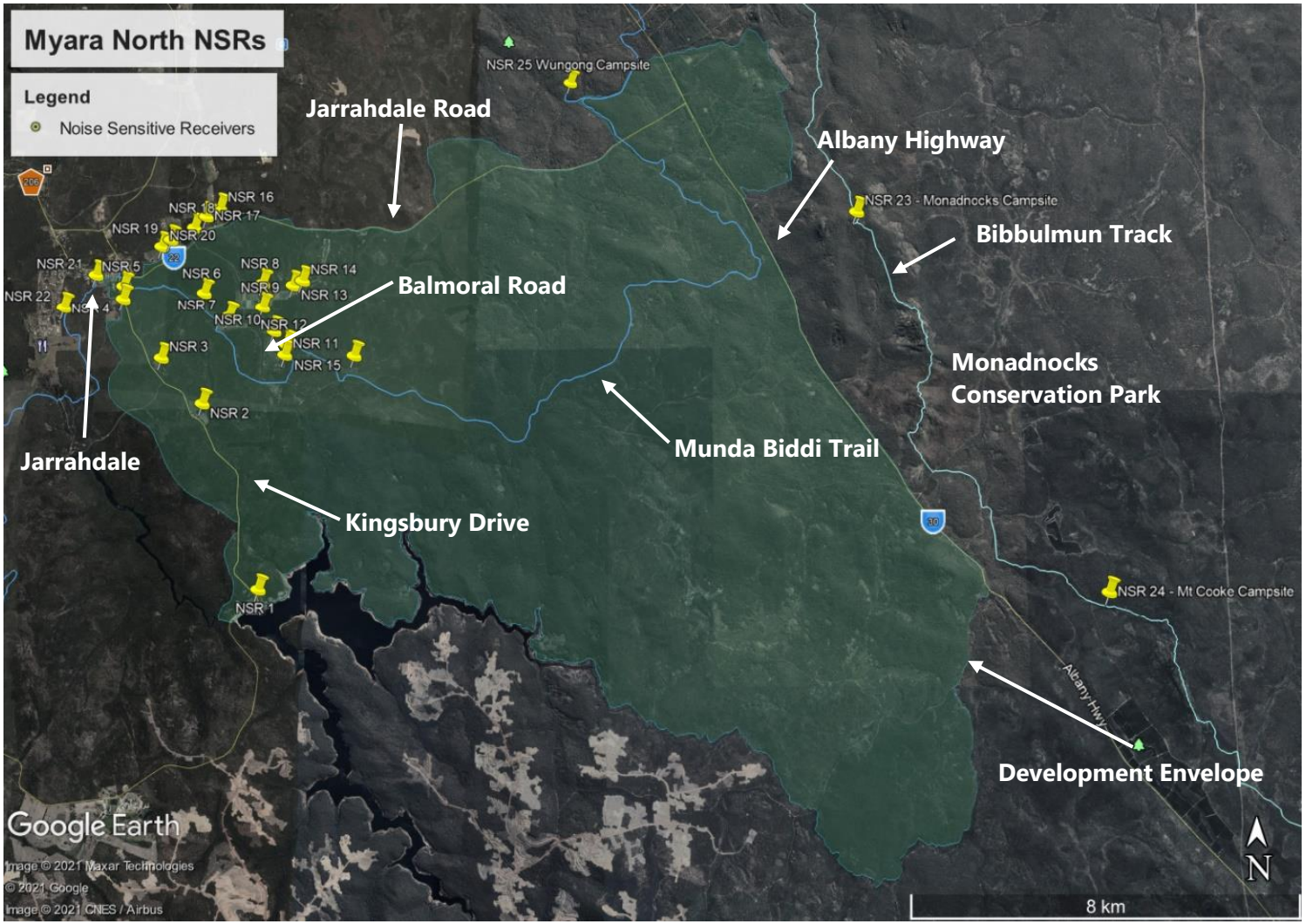


Figure 2-1 : Locations of Myara North Noise Sensitive Receivers

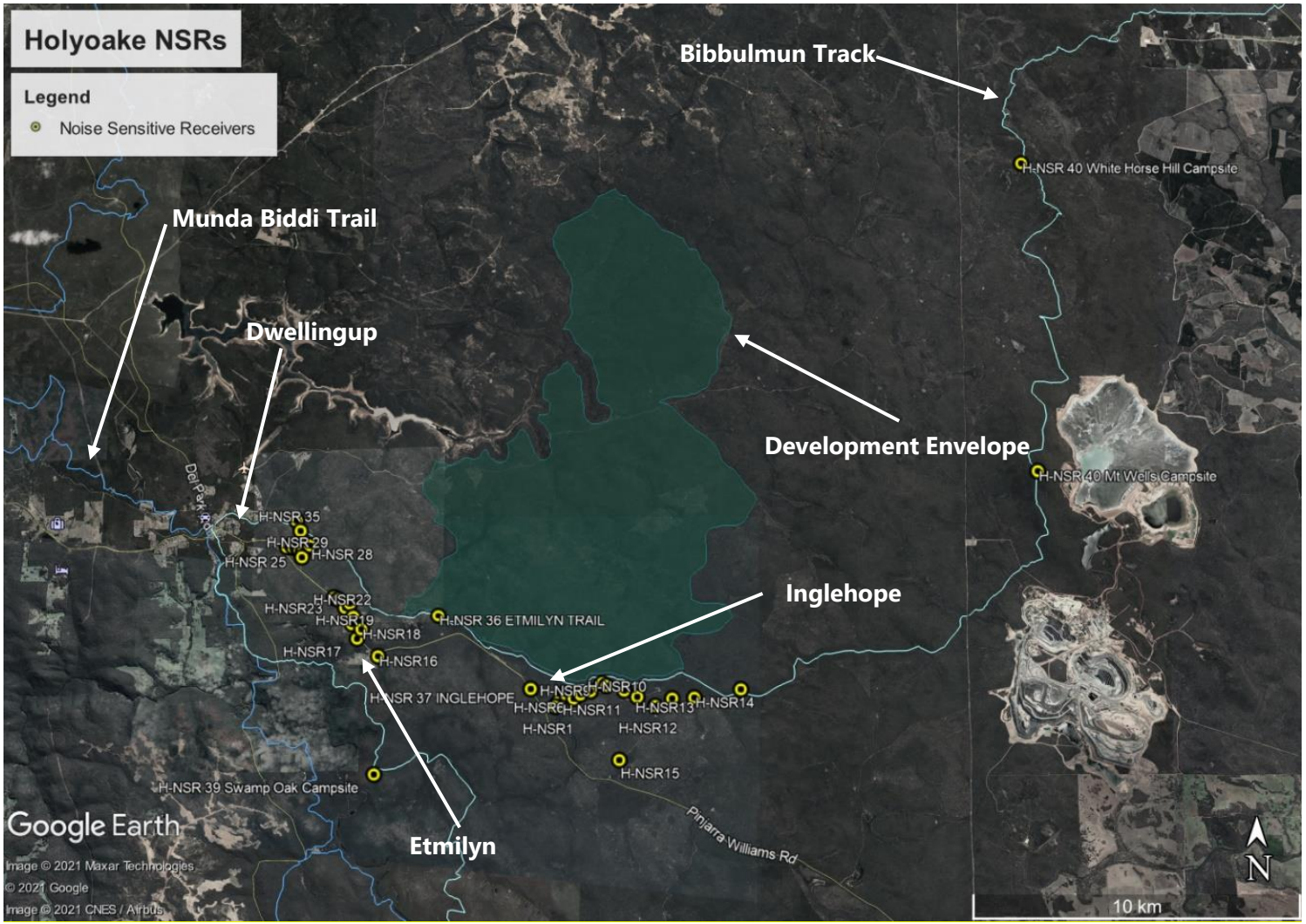


Figure 2-2 : Locations of Holyoake Noise Sensitive Receivers

None of the selected receivers are within 450m of industrial or commercial zoned land, or major or secondary roads. Therefore, no influencing factors apply.

Table 2-3 presents the L_{A10} Assigned Levels, at the selected receptors.

Table 2-3 : Assigned Levels at Selected Receivers

Time of Day	Assigned Level – L_{A10} dB(A)
0700 to 1900 hours Monday to Saturday	45
0900 to 1900 hours Sunday and public holidays	40
1900 to 2200 hours all days	40
2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35

2.3 Adjustments for Intrusive Characteristics

Received noise levels associated with the equipment within the proposed Myara North and Holyoake mine regions must be adjusted if the noise exhibits intrusive or dominant characteristics which cannot be reasonably or practicably removed, i.e. if the noise is impulsive (e.g. banging), tonal (e.g. whining noise having a defined pitch) or modulating (e.g. noise which varies cyclically in either pitch or amplitude). Table 2-4 presents the adjustments required when intrusive or dominant characteristics cannot be reasonably and practicably removed. The adjusted noise levels must now comply with the Assigned Levels. Regulation 9 sets out objective tests to assess whether the noise is taken to be free of these characteristics.

Table 2-4 : Adjustments for Intrusive or Dominant Noise Characteristics

Adjustment where noise emission is not music these adjustments are cumulative to a maximum of 15 dB		
Where tonality is present	**Where modulation is present**	**Where impulsiveness is present**
+5 dB	+5 dB	+10 dB

2.4 Applicable Limits to Blasting Operations

Since blasting noise is typically infrequent and of very short duration, blasting noise is generally assessed using linear peak instantaneous noise levels. Section 11 of the *Environmental Protection (Noise) Regulations 1997* states:

- No airblast level resulting from blasting on any premises or public place, when received at any other premises, may exceed ---

  a) 125dB $L_{Linear\ peak}$ between 0700 hours and 1800 hours on Monday to Saturday inclusive; or

  b) 120dB $L_{Linear\ peak}$ between 0700 hours and 1800 hours on a Sunday or public holiday.

- Notwithstanding subregulation above, airblast levels for 9 in any 10 consecutive blasts (regardless of the interval between each blast), when received at any other premises, must not exceed ---

  a) 120dB $L_{Linear\ peak}$ between 0700 hours and 1800 hours on Monday to Saturday inclusive; or

  b) 115dB $L_{Linear\ peak}$ between 0700 hours and 1800 hours on a Sunday or public holiday.

- No airblast level resulting from blasting on any premises or public place, when received at any other premises, may exceed ---

  a) 90dB $L_{Linear\ peak}$ outside the periods between 0700 hours and 1800 hours on any day except where that blasting is carried out in accordance with regulation 8.28 (4) of the *Mines Safety and Inspection Regulations 1995*; or

  b) the levels specified in subregulations above outside the periods between 0700 hours and 1800 hours, as appropriate for the time when it was intended that the blast be fired, if the exception in paragraph (a) applies.

3 AMBIENT NOISE MONITORING

As part of this noise assessment, background noise monitoring was conducted between the 4th July 2020 and 10th September 2020.

The purpose of the background noise assessment is:

- To provide a baseline from which to identify the impact of noise level increases associated with operational noise from within the Myara North and Holyoake mine regions;
- To identify the likelihood of noise exceedances resulting from the combination of the existing ambient noise (including industrial noise emissions) with that of the Myara North and Holyoake mine regions; and
- To enable assessment of the likely audibility of noise from the Myara North and Holyoake mine regions including any tonal, modulation or impulsive components.

3.1 Noise Monitoring Locations

Noise loggers were deployed at 16 locations, eight loggers were located to the west, north and east of the proposed Myara North region and a further eight loggers were located to the west and south of the proposed Holyoake region. Table 3-1 details the location, deployment dates and lists the NSRs represented by the loggers. Figure 3-1 and Figure 3-2 show the location of the loggers in each proposed mine area.

The locations were selected due to their proximity to residential/ rural properties, recreational campsites and where ambient noise levels are expected to be typical of the surrounding setting. The selected locations are generally places where people reside or expected to undertake recreational activities which may be impacted by noise.

Table 3-1 Noise Monitoring Locations and Deployment Dates

Mining Area	Relevant NSRs	Logger ID	Coordinate Northing	Coordinate Easting	Deployment Dates
Myara North	NSR 1	RASL 16	32.401935°S	116.102963°E	04/07/20 to 24/07/20
	NSR 3	RASL 14	32.357586°S	116.079315°E	25/07/20 to 05/08/20
	NSR 14	RASL 13	32.341973°S	116.112319°E	05/07/20 to 22/07/20
	NSR 18	RASL 14	32.330265°S	116.088549°E	28/08/20 to 10/09/20

Mining Area	Relevant NSRs	Logger ID	Coordinate Northing	Coordinate Easting	Deployment Dates
	NSR 20	RASL12	32.334835°S	116.079301°E	6/08/20 to 26/08/20
	NSR 21	RASL10	32.341672°S	116.062103°E	07/08/20 to 27/08/20
	NSR 22	RASL 14	32.346602°S	116.057855°E	14/08/20 to 27/08/20
	NSR 24	RASL 12	32.403208°S	116.292179°E	25/07/20 to 05/08/20
Holyoake	H-NSR 4	RASL 15	32.757882°S	116.179569°E	25/07/20 to 03/08/20
	H-NSR 10	RASL 16	32.759523°S	116.201716°E	26/07/20 to 05/08/20
	H- NSR 13	RASL 13	32.763540°S	116.216509°E	26/07/20 to 05/08/20
	H-NSR 16	RASL 16	32.749182°S	116.119019°E	28/08/20 to 10/09/20
	H-NSR 17-24	RASL 16	32.742983°S	116.108535°E	06/08/20 to 27/08/20
	H-NSR 25-35	RASL 13	32.715345°S	116.094746°E	07/08/20 to 26/08/20
	H-NSR 36	RASL 12	32.738235°S	116.137783°E	28/08/20 to 07/09/20
	H-NSR 37	RASL 13	32.759758°S	116.168524°E	28/08/20 to 07/09/20

Monitoring was undertaken at NSR 24 Mt Cooke campsite, which was accessible by vehicle, however NSR 38 Chadora campsite was not accessible by vehicle and, therefore, noise logging equipment could not be installed at this NSR. It is expected that noise logging at Mt Cooke will be sufficient as an indication of ambient noise that may be recorded elsewhere on the Bibbulmun Track with a similar setting.

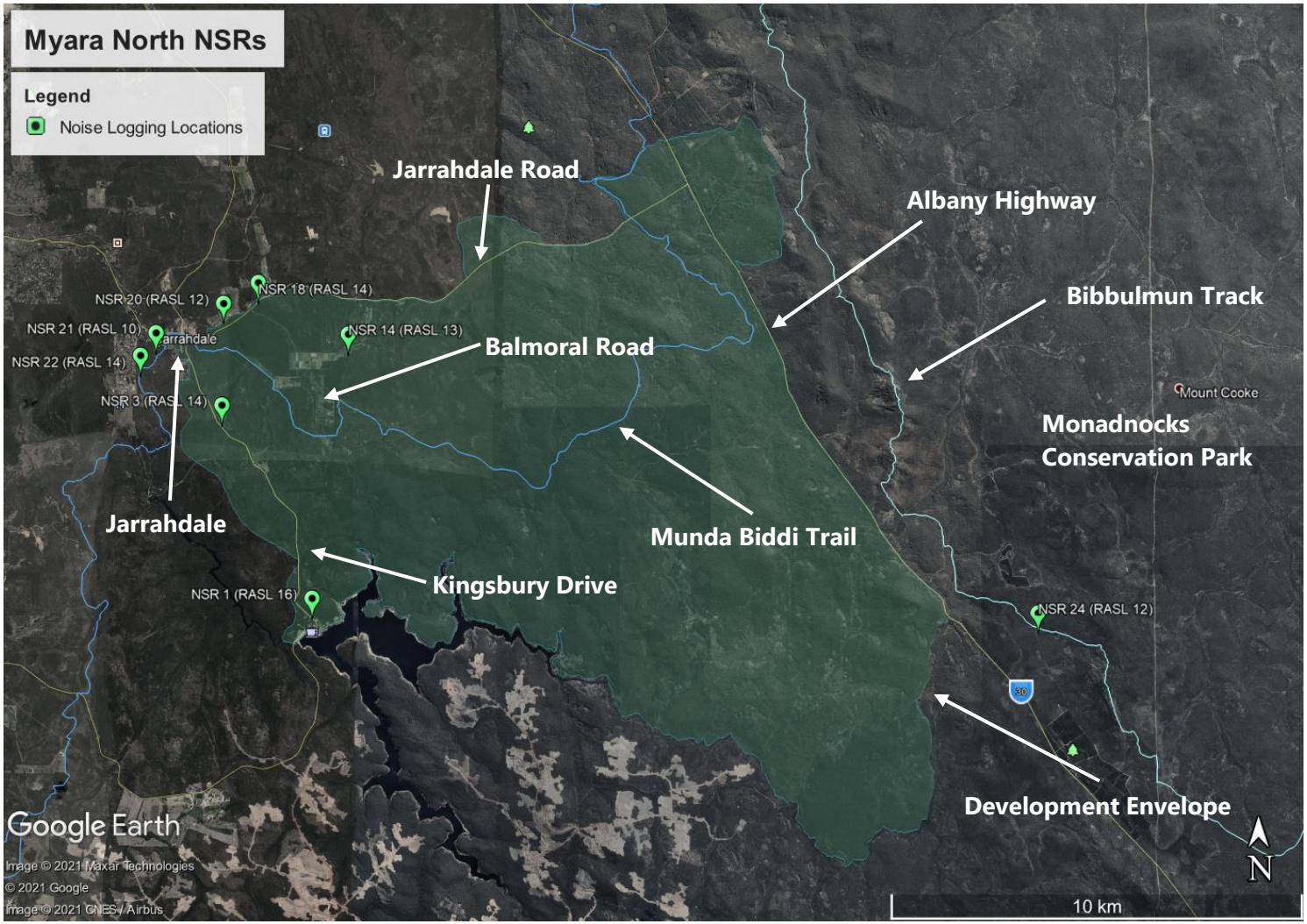


Figure 3-1 Myara North Noise Logger Locations

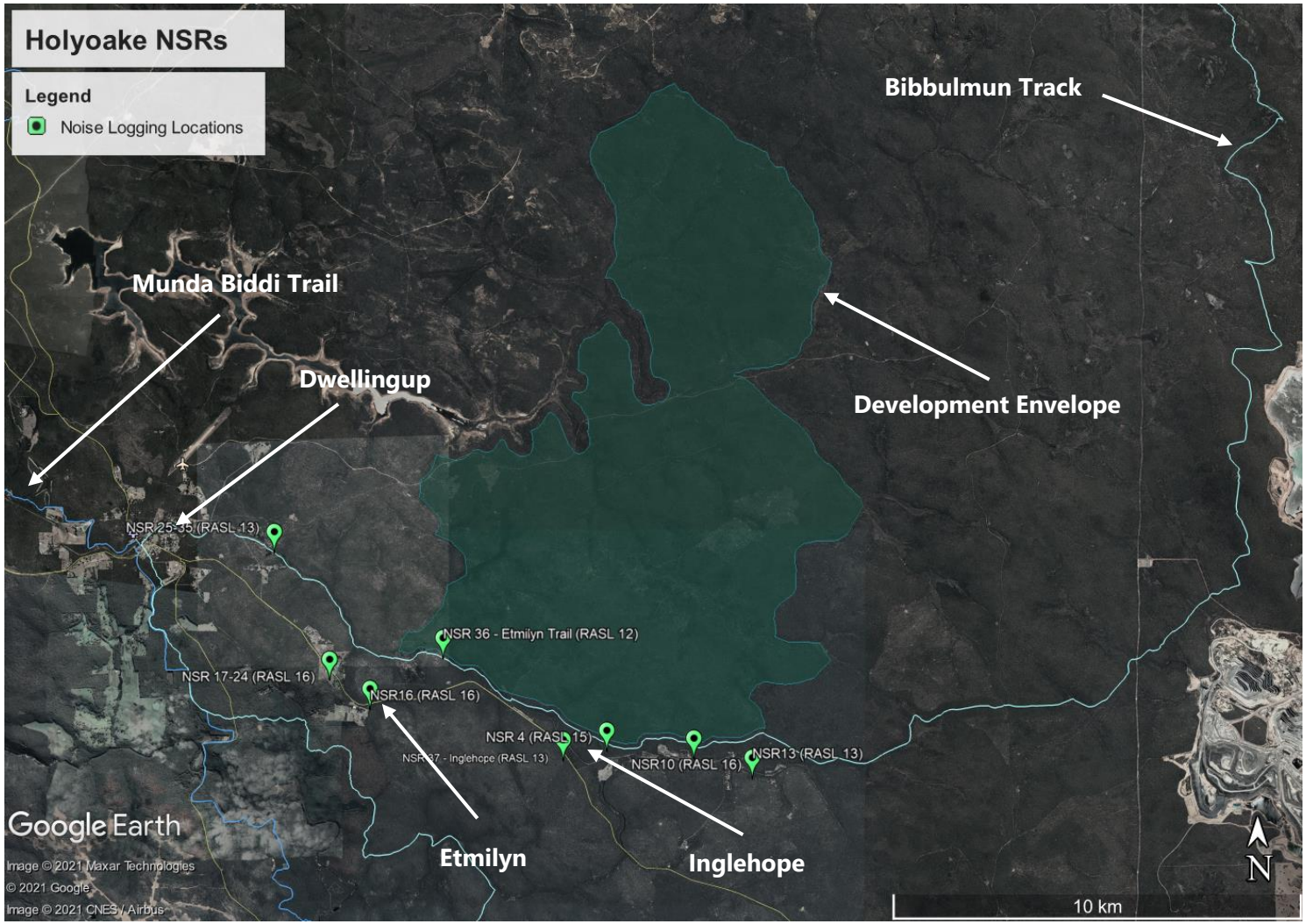


Figure 3-2 Holyoake Noise Logger Locations

A list of instrumentation and their serial numbers used in the baseline noise monitoring is provided in APPENDIX A.1.

Each meter was set to log overall and third-octave band every second. The meters were calibrated before and after logging and the calibration drift was within the tolerance specified in the Environmental Protection (Noise) Regulations 1997.

Using the second-by-second spectral data collected by the noise loggers, Wood determined L_{AS10} & L_{AS90} for each period (i.e. day, evening and night) for the frequency bands 40 Hz to 1 kHz. These bands were selected as they capture environmental noise emissions from operations (mobile equipment and plant) and exclude some extraneous noise (such as insects). The noise levels within these bands will still include some minimal contribution from extraneous noise sources such as cars, frogs and some birds as these elements also emit noise within the selected band range.

Calibration certificates for the above instrumentation are available on request.

3.2 Measured Background Noise Levels

The logged noise data was analysed by Wood to determine day, evening or night-time periods which contained low levels of extraneous noise and could therefore be considered as representative of the lowest background noise levels. Selected periods contained the following:

- Minimal to no road traffic noise;
- Minimal to no contribution from fauna;
- Minimal to no wind noise; and
- Transient or localised noise not representative of typical underlying background.

General observations were also noted by Wood personnel such as the presence of operations (mining or plant) noise and, if relevant, the source of extraneous noise.

Table 3-2 and Table 3-3 present a summary of representative background noise for the noise loggers located at Myara North and Holyoake, respectively. The presentation of data in the tables is as follows:

- The periods presented in the table are periods with little extraneous noise, thus representing underlying ambient noise levels;
- The relevant NSRs covered by each logger location are listed in the table;
- The individual period values (day, evening or night) for statistical indices, (L_{10} and L_{90}) are for the entirety of the period length and are presented as a ranges for the selected periods; and

- Background and extraneous noise contributions were observed by Wood via continuous audio recordings recorded by the noise loggers.

The logging and data analysis meets or exceeds the expectations of the Draft Guideline on Environmental Noise for Prescribed Premises.

3.2.1 Myara North Background Levels

The ambient noise monitoring program at Myara North NSRs features typical noise associated with community activities including dogs, livestock and noise from use of hand tools. Traffic increasingly features in the soundscape from approximately 4am onwards as community members commence activities for the day and continue to feature prominently for the daylight hours. The night-time recorded L_{90} values are typically between 20 to 35 dB(A) and are typical of soundscape in a rural setting. Recorded L_{10} values during night-time periods generally range from 25 to 50 dB(A). Occasionally during quiet periods, faint rumbling and revving characteristics of emissions from mobile equipment can be heard. The source of this noise is unknown.

Table 3-2 presents a summary of background noise for the noise loggers located at Myara North for periods with little to no extraneous noise influence. A full summary of logged noise levels for each logger over the entire deployment can be found in APPENDIX A.2.

Table 3-2 Summary of Logged Noise Data for Myara North Loggers

Relevant Noise Sensitive Receptors (NSRs)	Period	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Observations
NSR1	Daytime	20.1-33.4	44.9-53.4	Ambient noise includes community noise, road and air traffic, birds and localised machinery noise
	Evening	18.2-30.1	24.7-45.1	Ambient noise includes dogs Barking, road and air traffic, birds and localised machinery noise
	Night-time	17.5-37.9	19.8-52.2	Ambient noise includes dogs Barking, birds and localised machinery noise
NSR3	Daytime	23.2-39.4	48-56	Ambient noise includes birds, cars passing, community noise (radio playing nearby)
	Evening	19.4-36.5	25.4-54.8	Ambient noise includes occasional car / plane passing and fauna (frogs / insects)
	Night-time	19.1-29.1	25.2-50.7	Ambient noise includes occasional car passing and fauna (frogs, insects and birds chirping)
NSR14	Daytime	24.5-34.3	38.9-55.8	Ambient noise includes birds traffic and community noise (intermittent construction activities and human activity close to monitor)
	Evening	20.8-35.2	26.5-52.5	Ambient noise includes air traffic, road traffic and fauna (dogs barking, birds and frogs)

Relevant Noise Sensitive Receptors (NSRs)	Period	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Observations
	Night-time	21.1-39.8	30.4-57.2	Ambient noise includes occasional road traffic and fauna (dogs barking, birds, rooster and frogs)
NSR18	Day time	23.7-43.1	47.6-59.2	Ambient noise includes road traffic, wind and trees rustling, bird noise and localised mobile equipment / hand tools.
	Evening	21.7-40.5	32.5-54.2	Ambient noise includes road traffic, insects, frogs, community noise and localised activities – fixed plant equipment
	Night-time	22.5-32.3	33.5-51.2	Ambient noise includes insects, frogs, owls. Localised activities – fixed plant equipment operational. Birds and traffic dominant from dawn until end of period.
NSR20	Daytime	25.5-37	44.5-56.3	Ambient noise includes traffic, birds and localised machinery noise (possibly a generator). During quiet periods the sound of mobile equipment revving is faintly audible.
	Evening	19.9-35.9	30-60.1	Ambient noise includes traffic, birds, frogs, insects, wind / trees rustling and localised machinery noise (possibly a generator). During quiet periods the sound of mobile equipment revving is faintly audible.
	Night-time	20.1-30.7	31.8-56	Ambient noise includes frogs, insects and traffic. Wind and rain present for small portions of the selected nights. During quiet periods the sound of mobile equipment revving is faintly audible.
NSR21	Daytime	20.1-40.6	35.9-55.7	Ambient noise includes traffic, aircraft overhead, birds and dog barking. Wind and trees rustling audible for portions of the selected periods. During quiet periods the sound of mobile equipment revving is faintly audible.
	Evening	17.9-42	22.1-60.1	Ambient noise occasional traffic noise and dogs barking. Faint noise from frogs and birds. During quiet periods the sound of mobile equipment revving is faintly audible.
	Night-time	17.6-46.1	24-58.2	Ambient noise occasional traffic noise and dogs barking. Faint noise from frogs and birds. Traffic and bird noise become significant from ~4AM. During quiet periods the sound of mobile equipment revving is faintly audible.
NSR22	Day time	21.2-34.6	37.5-49.6	Ambient noise includes birds, traffic, aircraft overhead and wind. A low frequency rumble is faintly audible during quiet periods.

Relevant Noise Sensitive Receptors (NSRs)	Period	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Observations
	Evening	17.7-37.7	20.8-57.3	Minimal extraneous noise during the period. However, frogs, dogs barking and birds are audible at time. A low frequency rumble is faintly audible during quiet periods.
	Night-time	18-29.9	27.6-45.1	Minimal extraneous noise during the period. However, frogs, dogs barking, wind and birds are audible at times. A low frequency rumble is faintly audible during quiet periods.
NSR24	Daytime	21.2-34.6	37.5-49.6	Ambient noise includes road traffic, airplanes overhead and wind.
	Evening	17.7-37.7	20.8-57.3	Minimal extraneous noise with occasional traffic noise and airplanes overhead
	Night-time	18-29.9	27.6-45.1	Minimal extraneous noise with occasional traffic noise, mainly during early morning, and is more prevalent during weekdays

3.2.2 Holyoake Background Levels

The ambient noise monitoring program at Holyoake NSRs recorded typical noise associated with community activities including dogs, livestock and noise from localised equipment. Traffic increasingly features in the soundscape from approximately 4 - 5am as community members commence activities for the day. The recorded noise levels at Holyoake indicate a slightly lower L_{90} range than Myara North. The recorded L_{90} values are generally from 17 to 30 dB(A) and are typical of soundscape in a rural setting. Recorded L_{10} values during night-time periods generally range from 25 to 55 dB(A). Occasionally during quiet periods, faint rumbling and revving characteristic of emissions from mobile heavy equipment can be heard. Source of this noise is unknown. Noise from the Dwellingup to Etmilyn Forest Train is audible at NSR 36 (Etmilyn Trail).

Table 3-3 presents a summary of background noise for the noise loggers located at Holyoake for periods with little to no extraneous noise influence. A full summary of logged noise levels for each logger over the entire deployment can be found in APPENDIX A.3.

Table 3-3 Summary of Logged Noise Data for Holyoake Loggers

Relevant Noise Sensitive Receptors (NSRs)	Period	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Observations
H-NSR 4	Day time	25.9-36.2	46.4-57.3	Ambient noise includes traffic and birds

Relevant Noise Sensitive Receptors (NSRs)	Period	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Observations
	Evening	19.7-32.3	30.2-49.8	Ambient noise includes traffic, birds screeching and community noise (music playing at residence)
	Night-time	19.1-25.8	30.9-45.7	Ambient noise includes traffic, birds screeching, geese and community noise (music playing at residence) until 12 to 1AM
H-NSR 10	Day time	18.7-31	30.8-53.3	Ambient noise includes birds, traffic, gusts of wind and occasional aircraft noise
	Evening	17-25.3	21.2-51.1	Ambient noise includes occasional traffic, bird noise (including an owl during post dusk) and light rain
	Night-time	16.6-23.6	23.1-47.2	Ambient noise includes localised rustling noise near monitor, frogs and occasional vehicles. A rooster is audible from dawn onwards.
H-NSR 13	Day time	18.5-34.2	30.8-54.3	Ambient noise includes light wind and rain, trees rustling, traffic, birds and insects chirping. During periods of low background noise a faint low frequency rumbling noise is audible.
	Evening	17.7-26.2	18.9-51.9	Minimal extraneous noise with the occasional bird, traffic and noise from fauna moving close to monitor. During periods of low background noise a faint low frequency rumbling noise and faint noise from heavy vehicles revving is audible.
	Night-time	17.6-24.7	19-49.2	Minimal extraneous noise with the occasional bird, traffic and noise from fauna moving close to monitor. During periods of low background noise, a faint low frequency rumbling noise and faint noise from heavy vehicles revving is audible.
H-NSR 16	Day time	24-41.8	48.4-57.8	Ambient noise includes fairly constant traffic, birds chirping, wind and trees rustling
	Evening	21.5-36.1	32.7-54.9	Ambient noise consists of traffic, light wind, trees rustling, insects and other fauna (ducks and frogs). During periods of low background noise, faint noise from heavy vehicles revving is audible.
	Night-time	18.8-32.8	35.9-54.6	Ambient noise consists of light wind, trees rustling, insects and other fauna (ducks and frogs). Traffic becomes dominant post 0430. During periods of low background noise, faint noise from heavy vehicles revving is audible.
H-NSR 17-24	Daytime	29.8-37.4	48.6-58.8	Ambient noise includes traffic, birds and periods of wind.
	Evening	25.6-42.9	42-56.3	Ambient noise includes insects and frogs. During periods of low background noise, a faint low

Relevant Noise Sensitive Receptors (NSRs)	Period	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Observations
				frequency rumbling noise and faint noise from heavy vehicles revving is audible.
	Night-time	20.4-42.1	40.7-57.7	Ambient noise includes insects, frogs and community noise (music). During periods of low background noise, a faint low frequency rumbling noise and faint noise from heavy vehicles revving is audible.
H-NSR 25-35	Daytime	25.1-34.7	37.6-53.4	Ambient noise includes traffic, birds and community noise (people talking). During periods of low background noise, a faint low frequency rumbling noise and faint noise from heavy vehicles revving is audible.
	Evening	22.9-37.6	29-57.2	Ambient noise includes traffic, insects, birds and ducks. During periods of low background noise a faint low frequency rumbling noise is audible.
	Night-time	22.7-37.2	30.5-51.6	Ambient noise includes traffic, insects, birds and ducks. During periods of low background noise a faint low frequency rumbling noise is audible.
H-NSR 36	Daytime	19.2-39.7	37.7-55.1	Ambient noise includes wind and trees rustling, birds, and a passenger tram / train – likely the Etmylin Forest Tram.
	Evening	16.8-37.7	20.1-50.6	Ambient noise includes light wind and trees rustling, occasional traffic noise, insects and birds. During periods of low background noise a faint low frequency rumbling noise is audible.
	Night-time	17.2-26.5	24.4-49.7	Ambient noise includes light wind and trees rustling, occasional traffic noise, insects and birds. During periods of low background noise a faint low frequency rumbling noise is audible. Traffic is dominant post 0500
H-NSR 37	Daytime	21.4-46.1	50.7-61	Ambient noise includes light wind and trees rustling, fairly consistent traffic and birds chirping
	Evening	18-40	34-57.8	Ambient noise includes light wind and trees rustling, fairly consistent traffic and birds chirping. During periods of low background noise a faint low frequency rumbling noise is audible.
	Night-time	17.8-35.6	36.4-57.6	Ambient noise includes light wind, trees rustling and light rain. During periods of low background noise a faint low frequency rumbling noise is audible. Traffic is audible post 0400

4 NOISE MODELLING METHODOLOGY

4.1 Noise Model Program

A computer noise model has been developed for the various stages of the proposed Myara North and Holyoake mine regions using SoundPlan noise modelling software which has been previously accepted by WA Department of Water and Environmental Regulation (DWER) as appropriate for environmental noise prediction.

The inputs required in SoundPlan are noise source data, barriers/screens, ground topographical and absorption type data, assessed meteorological conditions and receiver point locations.

The model has been used to generate predicted noise contours for the area surrounding the Myara North and Holyoake operations and to predict noise levels at the selected noise sensitive receptors.

The model does not include noise emissions from any sources other than those associated with the Myara North and Holyoake mine regions. Noise emissions from existing mining operations, other neighbouring industrial sources, road traffic, aircraft, animals, domestic sources, etc. are excluded from the modelling.

It is noted the Myara North and Holyoake mine region development involves a transition of the Huntly Mine into these regions rather than undertaking additional mining activities concurrently with the existing operations. Some operational elements of the current mine activities (such has rehabilitation) and the ore crushing plus conveying facility will continue to operate at Myara. Active mining activities at Myara will cease upon transition to Myara North and Holyoake regions.

4.2 Noise Model Algorithm

SoundPlan provides a range of published noise propagation prediction algorithms that can be selected by the user. The CONCAWE[3,4] prediction algorithms were selected for consistency with previous modelling undertaken for Alcoa.

[3] CONCAWE (Conservation of Clean Air and Water in Europe) was established in 1963 by a group of oil companies to carry out research on environmental issues relevant to the oil industry.

[4] *The propagation of noise from petroleum and petrochemical complexes to neighbouring communities,* CONCAWE Report 4/81, 1981

The CONCAWE algorithms are also recommended by the WA Department of Water and Environmental Regulation (DWER) Draft Guideline[5].

4.3 Selection of Meteorological Conditions

SoundPlan calculates predicted noise levels for defined meteorological conditions. In particular, the following variables are included in the prediction algorithms and will affect the predicted noise level: temperature; Pasquill stability (temperature inversion); relative humidity; wind speed; and wind direction.

The "default meteorological conditions" as suggested by the WA DWER Draft Guideline have been used to determine the worst-case overall predicted noise levels at each selected noise sensitive receiving location (See Table 4-1).

Table 4-1 : Noise Model Meteorological Inputs for Worst-Case Conditions

Period	Temperature	Pasquill Stability	Wind speed	Wind Direction	Relative Humidity
Day	20 C	Pasquill Stability E	4 m/s	Worst-case (source to receiver)	50 per cent
Night	15 C	Pasquill Stability F	3 m/s	Worst-case (source to receiver)	50 per cent

4.4 Ground Topography, Buildings and Barriers

Topographical information for the acoustic model (in the form of 5 m topographical contours and LIDAR scans) has previously been provided by GHD in AutoCAD DXF shape file format. The ground contours were directly imported into the acoustic model.

Where relevant, the acoustic barrier effects and reflections due to existing structures (e.g. existing conveyor noise walls and transfer building) have been included in the model because of their potential influence on the modelled noise levels.

A moderately absorptive ground is assumed in the acoustic model (ground factor 0.6).

4.5 Noise Sources

Details of the noise sources and assumptions are provided in the following sections of this report. APPENDIX B summarises the sound power levels assumed for the noise sources in the model.

[5] *Draft Guideline: Assessment of Environmental Noise Emissions, Department of Water and Environmental Regulation, May 2021*

Sound power levels for new equipment associated with the proposed Myara North and Holyoake mine regions are based on measured sound power levels for similar equipment at Alcoa's mining operations and vendor provided information. The mining equipment sound power levels used in the modelling are based on higher-noise emitting examples of currently operating equipment to account for potential noise increases due to wear and tear .

4.5.1 Mobile Equipment Fleet

Table 4-2 : Assumed Mobile Equipment Fleet

Equipment Type	Total Proposed Fleet Units	Assumed Operational Units[6]
Excavators 250T	4	3
190T Haul Trucks	18	12
Rock breaking Excavators	1	1
Loaders 993K	2	2
Loader 994	4	3
Contractor loaders	4	3
Watercarts	3	2
Graders	3	2
Floats*	3	-
Dozers	7	5
Scrapers	7	5
Excavators for Soil & Overburden removal	7	5
Blast drills	5	4
Ancillary loaders	5	4
Ancillary trucks	3	2
Dual Powered Road Trains	23	15
Note: * Floats have been assumed to be an intermittently operational source and have been excluded from the model.		

[6] Based on an availability of ~65 per cent (rounded to the next full unit & assuming 5500 operational hours per year per operational unit)

4.5.2 Fixed Plant

Table 4-3 : Assumed Fixed Infrastructure

Equipment Type	Total Proposed Units	Assumed Operational Units
ROM Primary and Secondary Sizer (3,300 tph)	2	2
Diesel Generator (1.12 MW) – Myara North Transfer Station	7	6
Diesel Generator (0.6 MW) – Myara North Fixed Infrastructure Area	7	6
Overland Conveyors	2	2

4.5.2.1 Balance of Plant

The sound power levels for minor equipment within the Fixed Infrastructure Area have have been based on the following:

- Noise levels for large pumps and motors (where applicable) have been assumed to meet 85 dB(A) at 1 m per the Alcoa Equipment Noise Specification;
- Smaller pumps (120 hp or less) have been assumed to operate between 70 and 84 dB(A) at 1m depending on pump power and Wood's experience with similar noise sources.

4.6 Mining Locations

The distribution of the proposed mining pits for the proposed Myara North and Holyoake mine regions are as presented in Figure 4-1 and Figure 4-2.

The mining pits for Myara North are based on the current indicative mine plan developed from results of exploration programmes conducted by Alcoa.

The mine plan for Holyoake is currently indicative and shown as mining blocks which are subject to further exploration. They are based on the following criteria:

- expected mining rate;
- average bauxite quality and depth;
- typical bauxite locations (i.e. Dwellingup upland landform); and
- weighting of locations 2/3 towards NSRs.

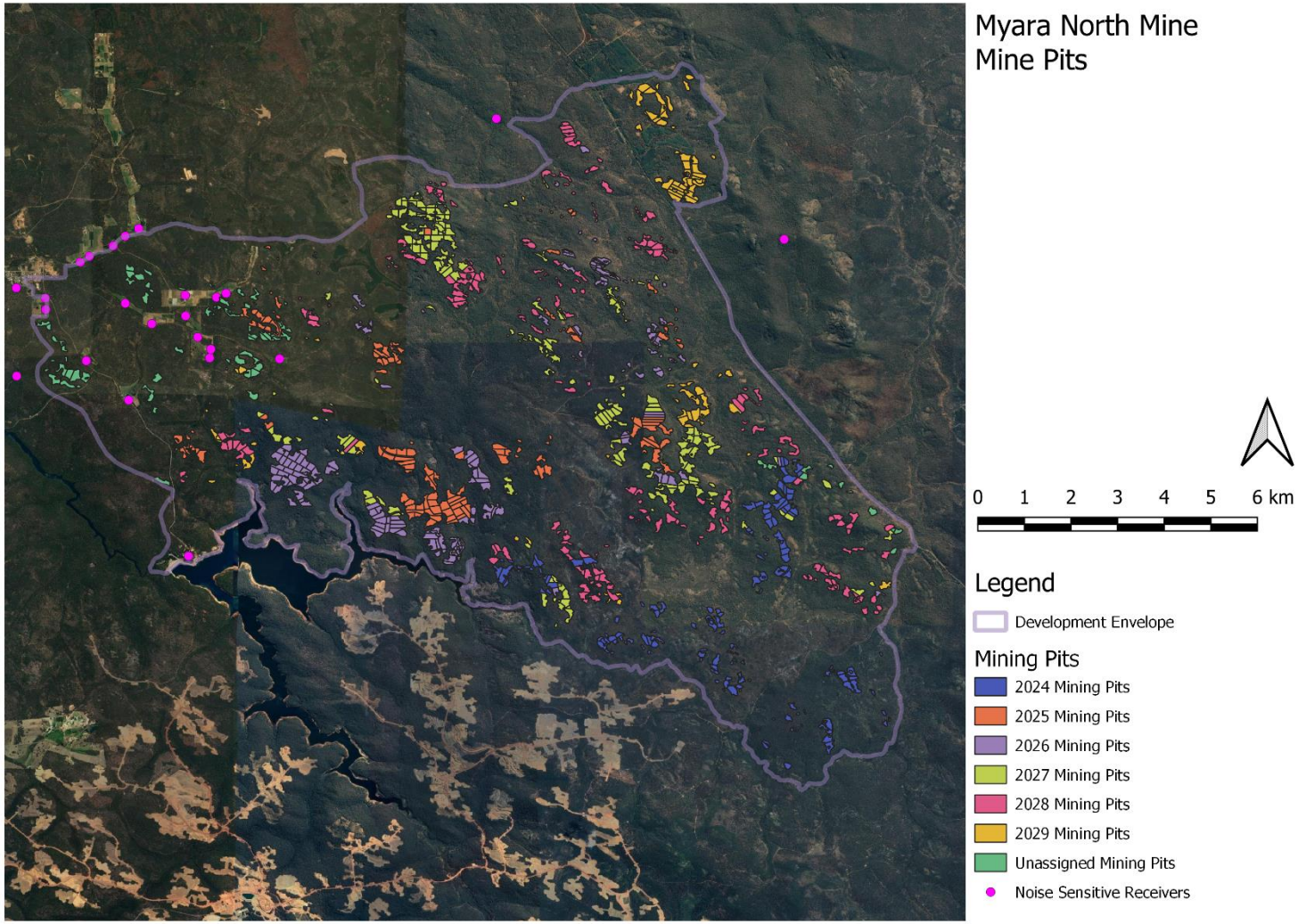


Figure 4-1 Myara North Indicative Mining Locations

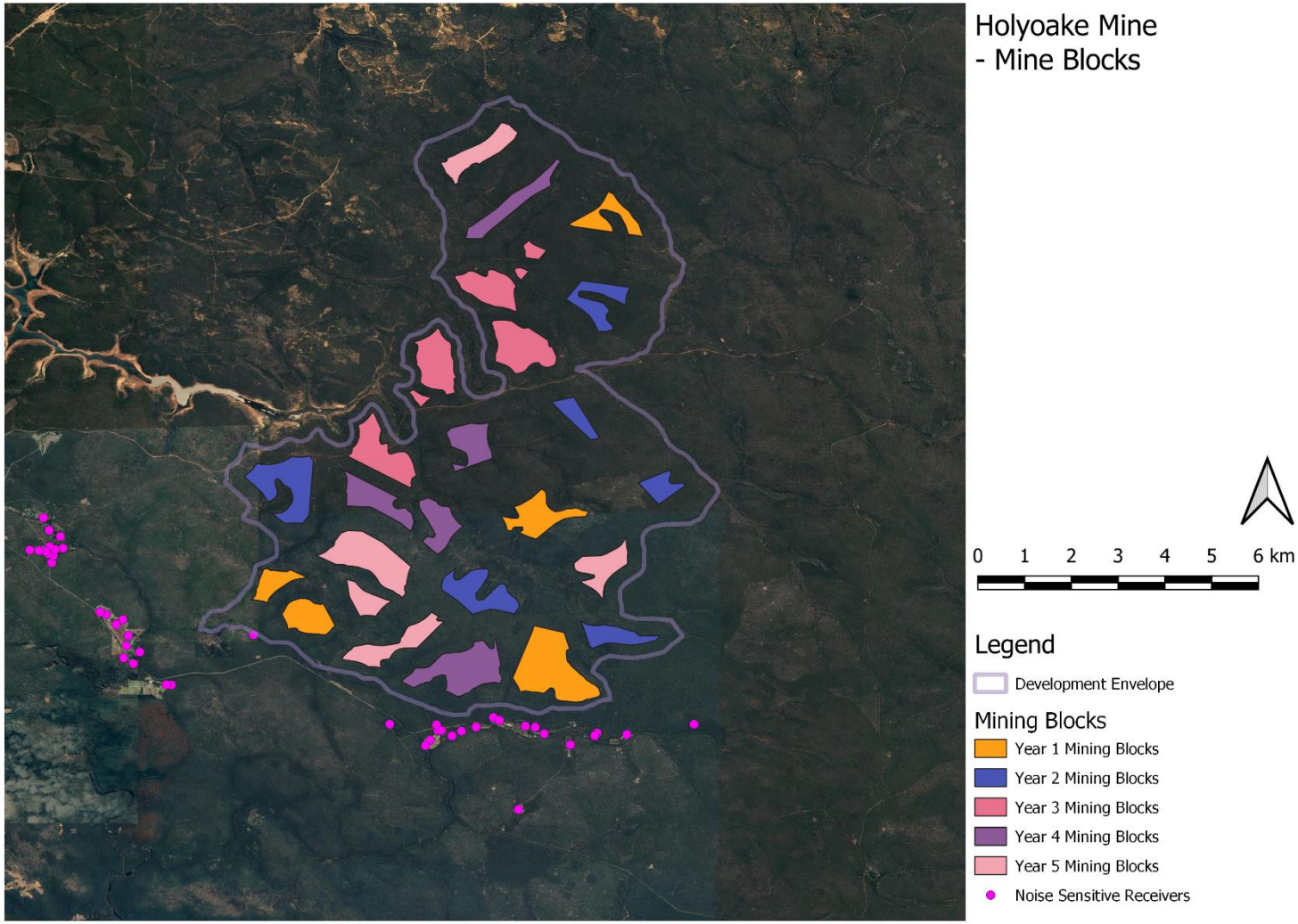


Figure 4-2 Holyoake Indicative Mining Locations

5 SENSITIVITY MODELLING

An initial model was used to identify the contributing noise sources at key receivers and to determine the noise reductions required to achieve Alcoa's noise objectives at these receivers. All noise level predictions represent the default worst-case conditions for sound propagation as required by the *Draft Guideline: Assessment of Environmental Noise Emissions, Department of Water and Environmental Regulation, May 2021*.

In order to achieve the highest likelihood of compliant operations, a noise sensitivity modelling study was carried out prior to the modelling for the impact assessment.

Based on the locations of the ore bodies provided by Alcoa, sensitivity modelling was undertaken to define the level of noise control required to allow mining to occur within a number of defined noise sensitivity zones.

The assumptions used in the development of these noise sensitivity zones are as follows:

Assumptions

• Mining operations have been conservatively assumed to be occurring at surface level[7].
• Only pits within a 4 km radius of identified noise sensitive receivers were modelled[8].
• Noise modelling was conducted for 1 work unit comprising the following elements:
  ○ 1 x 250T Excavator unit;
  ○ 1 x 190T Haul Truck idling beside Excavator unit;
  ○ 4 x 190T Haul Trucks travelling between active pit and Fixed Infrastructure Area; and
  ○ 1 x 190T Haul Truck on high idle unloading at the ROM stockpile area.
• Equipment operating within the Fixed Infrastructure Area are as described in Section 4.5.2.
• Only 1 work unit operating within the 4 km radius for all receivers at any one time[9].
• Fleet types used for the development of the sensitivity scenarios are as follows:
  ○ Standard Fleet: Current Alcoa Myara mining fleet to be reassigned to Myara North[10];

[7] Actual in pit mining to an average depth of 3 – 5 metres is currently expected. The height of the pit wall is expected to provide some localised shielding of noise emissions when mobile equipment is operating in close proximity to the wall.

[8] Mining operations outside this range are not expected to be significant. Noise emissions from equipment within the Fixed Infrastructure Area and Overland Conveyors have been included in the calculation for completeness.

[9] No simultaneous/ multiple operations in close proximity have been considered. It is assumed that Alcoa mine planners will be able to simultaneously mine blocks outside of the 4 km radiuses to obtain the required grade mix in each year.

[10] The mining equipment sound power levels used in the modelling are based on high-noise emitting examples of currently operating equipment to account for potential noise increases due to wear and tear.

Assumptions
○ Attenuated Fleet: Based on the Alcoa Myara Fleet but incorporating additional noise controls (e.g. engine bay treatments and upgraded exhaust silencers); and ○ High Spec Low Noise Fleet: Based on the current Myara Fleet but considers a 10 dB reduction in sound power emissions from the equipment[11].

5.1.1 Sensitivity Zone Definitions

The noise sensitivity zones are defined in Table 5-1.

Table 5-1 : Noise Sensitivity Zone Definitions

Zone	Sensitivity	Definition
Restricted Mining Zone	Severe	Zones adjacent to receivers. High risk of non-compliance and/or complaints. Compliance with Assigned Levels is likely to require no mining or highly restricted mining with extensive controls. Opportunistic mining may be possible under 'favourable' weather conditions. Careful management and noise monitoring will be required.
High Spec Low Noise Mining Zone	High	Zones closest, but not adjacent, to receivers. Mining noise emissions controllable through 'optimised mining' with a low noise fleet. Mining activities require evaluation through active modelling and customised noise control strategies for day & night.
Attenuated Mining Zone	Medium	Zones further away but still close to receivers. Mining required with noise controlled fleet. Activities require evaluation through active modelling to determine risk of exceedance during night mining with customised noise control strategies
Standard Mining Zone	Low	Mining with Alcoa's existing fleet possible without requiring additional noise controls or management

5.2 Noise Sensitivity Zones

The noise sensitivity zones for the proposed Myara North and Holyoake mining regions are presented in Figure 5-1 to Figure 5-4.

[11] If level is unachievable through noise control implementation, then smaller/ lower powered equipment models will need to be considered.

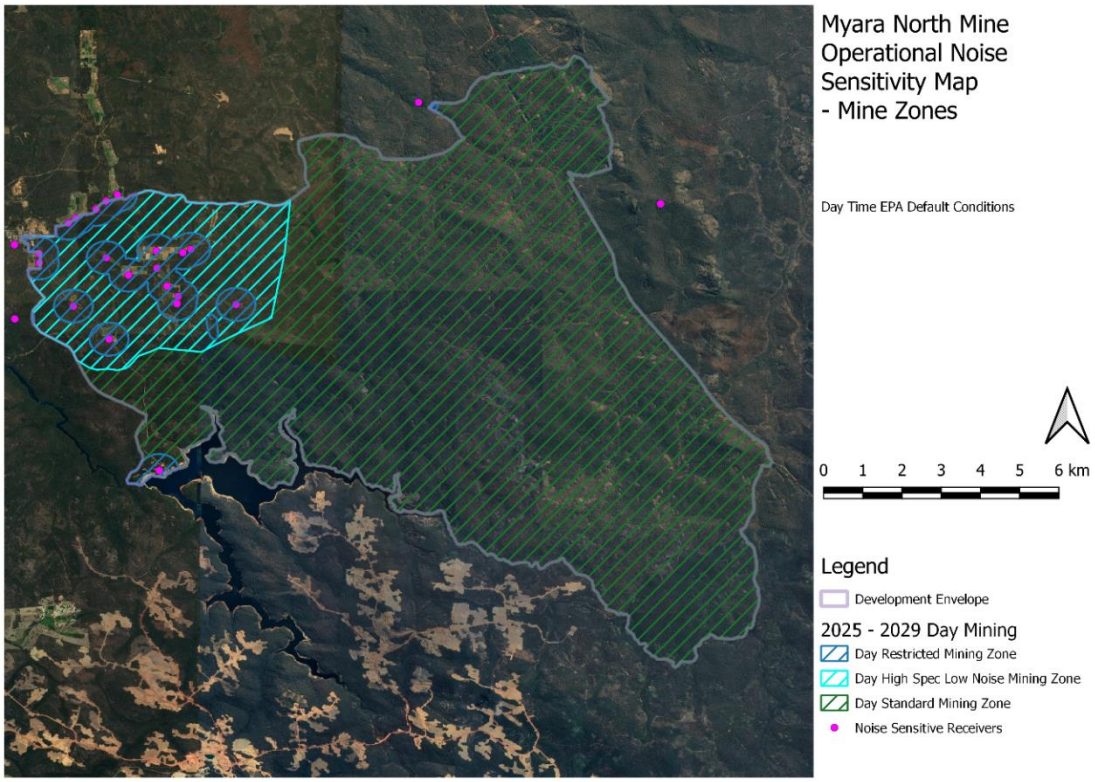


Figure 5-1 Myara North Day Time Mining Noise Sensitivity Zones

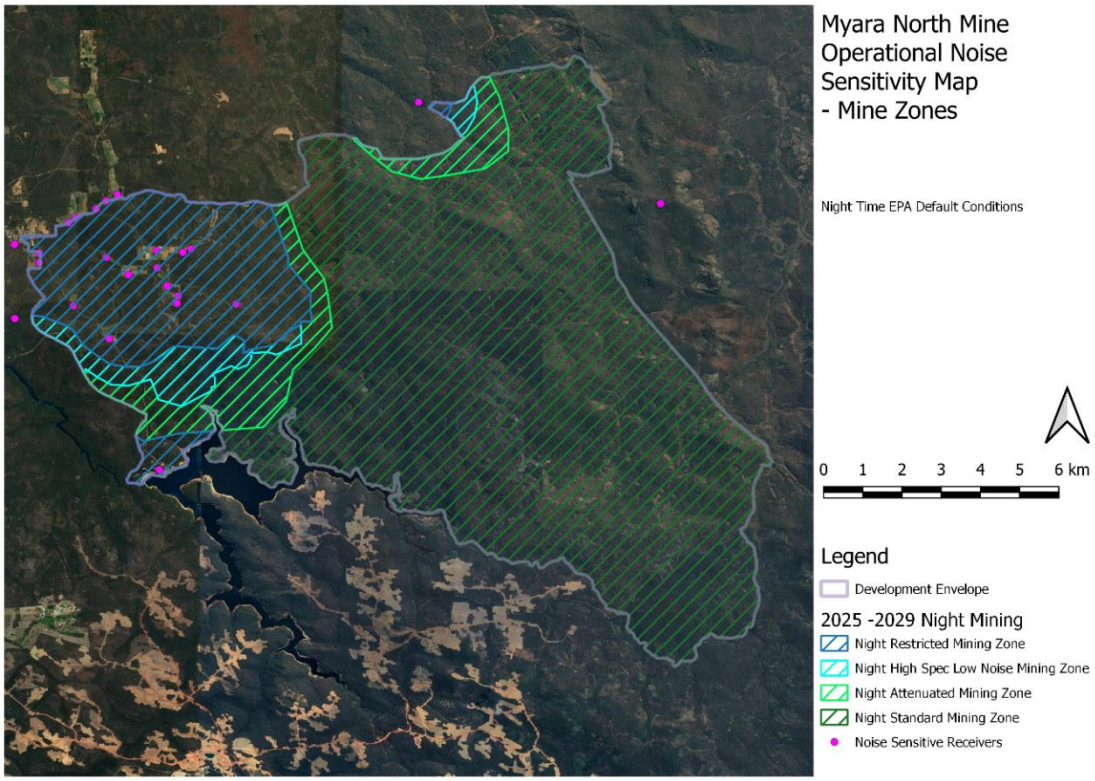


Figure 5-2 Myara North Night Time Mining Noise Sensitivity Zones

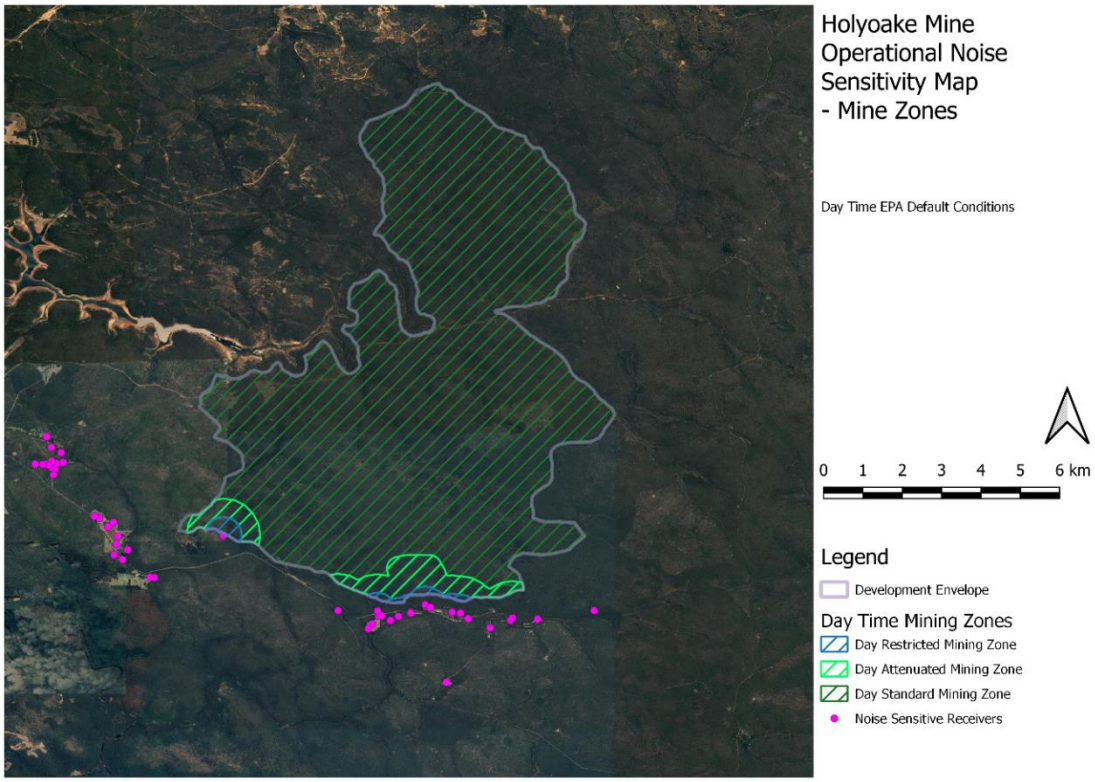


Figure 5-3 Holyoake Day Time Mining Noise Sensitivity Zones

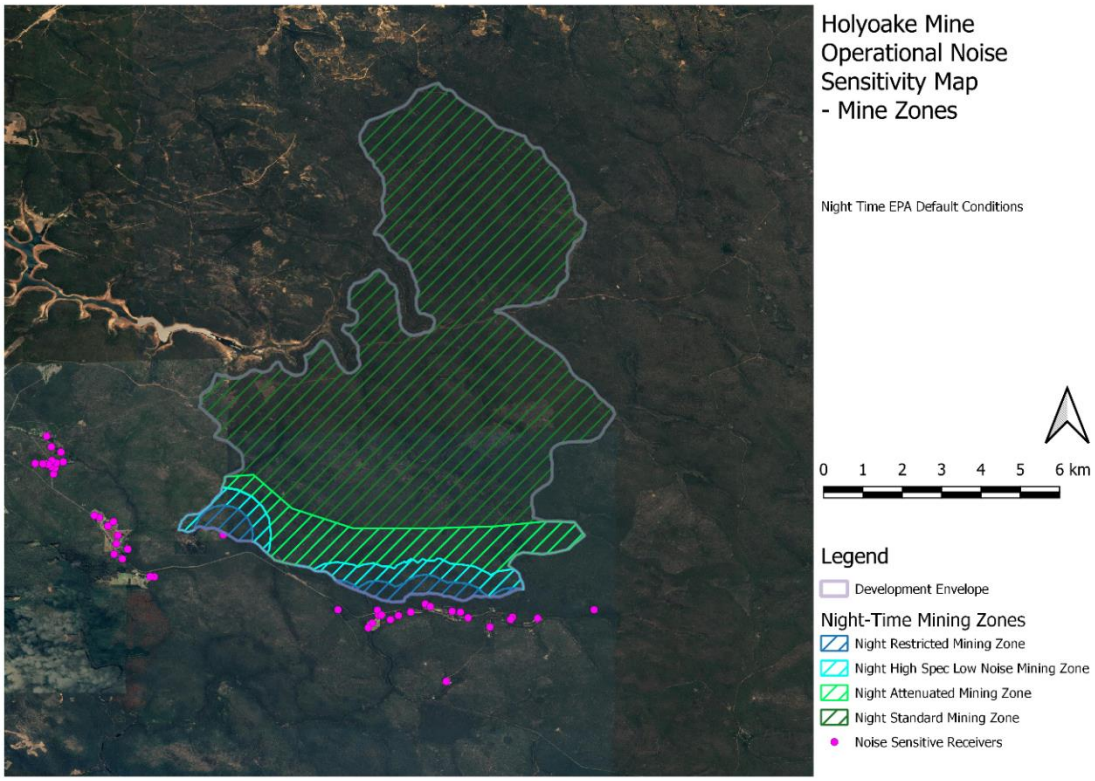


Figure 5-4 Holyoake Night Time Mining Noise Sensitivity Zones

6 MODELLING RESULTS

6.1 Model Scenarios

Based on the noise sensitivity zones presented in Section 5.2, the following model scenarios were investigated using the indicative mine development plan for the proposed Myara North and Holyoake mining regions.

6.1.1 Myara North Mine Development

The following noise model scenarios were investigated as part of the noise impact assessment for the development of the proposed Myara North mine region:

Table 6-1 : Noise Modelling Scenarios for Myara North

Scenario	Year	Mining Activities	Fixed Plant Construction Activities[12]
A	Pre-2024	Construction Activities in 2024 pits	Fixed plant construction activities commence
B	2024	Mining Operations in 2024 pits and Mine construction activities in 2025 pits	Fixed plant construction activities continue; long haul ore trucking commences
C	2025	Mining Operations in 2025 pits, Mine construction activities in 2026 pits and rehabilitation activities	Fixed plant construction activities continue; long haul ore trucking continues
D	2026	Mining Operations in 2026 pits, Mine construction activities in 2027 pits and rehabilitation activities	Fixed plant construction activities continue; long haul ore trucking continues
E	2027	Mining Operations in 2027 pits, Mine construction activities in 2028 pits and rehabilitation activities	Fixed plant facilities commence operations, long haul ore trucking ceases
F	2028	Mining Operations in 2028 pits, Mine construction activities in 2029 pits and rehabilitation activities	Fixed plant facilities continue operating
G	2029	Mining Operations in 2029 pits and rehabilitation activities	Fixed Plant Facilities continues operating

[12] Noise impacts associated with Fixed Plant construction have been excluded from the model. Activities such as long haul ore trucking which operate during the period when the Fixed Plant is being constructed has been included in the model. Noise from the operating fixed plant in the later mining years have been included.

The scenarios were selected to represent the likely combination of activities occurring in a particular year. The combination of scenarios allows further investigation into the effects of the varying arrangements of mine pits to the range of NSRs at different locations around the mine regions, including proximity of mine pits to the NSRs and effects of grouped pits.

6.1.1.1 Noise Level predictions

Table 6-2 presents the highest predicted noise levels under the EPA default, worst case weather conditions defined in *Draft Guideline: Assessment of Environmental Noise Emissions, Department of Water and Environmental Regulation, May 2021* at each of the selected receivers. The predicted levels represent the contribution of the Proposal to overall noise levels and do not include noise emissions for existing plant and equipment. This is considered appropriate as the Myara North and Holyoake mine region development involves a future transition of the current Myara region operations into the Myara North and Holyoake regions, rather than additional mining concurrent with the existing operations. Results presented in **bold text** denote predictions which exceed the Assigned Levels.

Noise contours for the various Myara North scenarios are presented in APPENDIX C. Contours are presented for the day time and night time assigned noise levels at 45 dB(A) and 35 dB(A) respectively (see Section 2.2), and for 5 dBA lower to indicate potential for exceedance in the event of tonality (see Section 7.3).

Table 6-2 : EPA Default Day Time Conditions Highest Predicted Noise Levels for the Myara North Mine Scenarios (0700 hours to 1900 hours, Monday to Saturday)

NSRs	EPA Default Day Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR1	15.4	22.4	21.1	24.2	24.4	22.3	23.4
NSR2	10.0	17.1	28.1	21.9	24.9	25.4	25.8
NSR3	6.2	10.2	21.8	16.6	17.3	19.8	18.6
NSR4	13.8	16.9	27.5	22.8	24.4	26.0	25.8
NSR5	11.2	14.1	24.4	17.9	19.2	22.8	21.9
NSR6	15.7	20.7	31.8	26.9	29.7	30.8	29.9
NSR7	11.3	21.2	25.7	21.8	24.5	24.7	23.5
NSR8	17.6	27.0	33.4	29.4	32.4	32.3	31.0
NSR9	18.4	27.5	35.3	30.8	33.9	34.1	33.1
NSR10	19.0	29.0	38.1	33.3	37.8	38.0	36.7
NSR11	19.8	28.8	40.5*	35.8	41.0*	41.2*	39.6
NSR12	19.7	29.6	39.6	34.6	39.8	39.7	38.3

NSRs	EPA Default Day Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR13	18.1	32.4	33.1	30.3	33.0	33.0	31.6
NSR14	17.3	33.9	33.3	31.0	33.0	32.4	31.8
NSR15	23.4	36.4	44.4*	41.8*	44.5*	43.2*	44.2*
NSR16	14.1	18.9	26.2	24.3	25.0	25.1	24.5
NSR17	10.6	16.4	23.7	22.4	24.1	23.6	23.7
NSR18	13.2	17.6	25.7	23.1	24.8	25.5	24.5
NSR19	14.2	17.6	25.3	23.2	23.5	24.7	24.3
NSR20	13.7	17.1	26.3	21.8	24.4	24.8	24.7
NSR21	12.9	15.6	24.1	21.5	22.0	23.1	23.1
NSR22	12.3	15.3	24.2	20.3	20.8	22.2	22.5
NSR23 Monadnocks Campsite	22.4	29.1	35.3	33.4	30.4	29.7	30.7
NSR24 Mt Cooke Campsite	21.0	27.6	21.0	31.9	27.6	27.2	27.3
NSR 25 Wungong Campsite	18.6	31.2	35.4	39.8	6.8	43.5*	42.2*

Note: Predicted noise levels denoted with an * indicate that they are exceeding the evening time Assigned Levels (1900 to 2200 hours all days).

Table 6-3 : EPA Default Night Time Conditions Predicted Noise Levels for the Myara North Mine Scenarios (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays)

NSRs	EPA Default Night Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR1	16.4	22.0	21.1	23.3	23.9	22.0	23.4
NSR2	10.5	17.8	22.7	20.6	20.5	21.2	25.3
NSR3	6.7	10.4	13.1	12.9	11.5	12.8	11.5
NSR4	14.6	17.5	19.4	19.4	18.8	18.7	18.8

NSRs	EPA Default Night Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR5	12.0	14.7	18.1	16.6	18.0	18.2	17.9
NSR6	16.5	19.6	23.3	22.8	22.6	22.5	22.5
NSR7	12.0	17.4	23.8	21.1	22.9	23.4	22.6
NSR8	18.5	22.4	29.0	26.5	27.5	28.2	27.6
NSR9	19.2	22.4	28.5	27.4	27.0	27.8	26.8
NSR10	19.9	24.1	29.4	28.7	27.9	28.8	30.2
NSR11	20.7	26.1	31.3	31.0	31.1	31.9	33.9
NSR12	20.7	25.2	30.7	30.6	29.9	30.4	32.3
NSR13	19.0	23.7	31.1	27.7	29.5	30.2	29.5
NSR14	18.3	24.1	30.6	27.3	29.3	30.4	29.4
NSR15	24.3	29.8	**36.7**	**35.1**	**35.6**	**36.0**	33.7
NSR16	14.9	18.8	24.3	22.3	24.0	23.7	23.6
NSR17	11.2	16.6	23.3	21.2	23.4	22.8	22.9
NSR18	14.0	17.5	22.6	20.6	22.5	22.0	22.1
NSR19	15.0	17.8	21.9	20.4	21.5	21.4	21.4
NSR20	14.5	17.2	21.2	20.0	20.7	20.5	20.1
NSR21	13.7	15.9	18.6	18.3	18.0	18.3	17.6
NSR22	13.1	15.6	17.4	17.5	16.2	16.1	16.0
NSR23 Monadnocks Campsite	23.3	29.7	34.9	32.8	29.9	29.3	30.1
NSR24 Mt Cooke Campsite	21.9	27.1	21.2	31.6	27.5	26.9	26.8
NSR 25 Wungong Campsite	19.4	31.9	35.0	**35.5**	**37.5**	**36.1**	35.0

Note: Noise levels in **BOLD** denote predictions which exceed the night-time Assigned Levels (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays).

The Nerang and Canning campsite on the Bibbulmun Trail are located approximately 6.5 kms and 10.5 kms from the edge of the proposed Myara North mining region DE. Due to the significant distances, it is unlikely that mining noise is expected to contribute to an exceedance of the Assigned Levels at these locations and have been excluded from the assessment.

6.1.1.2 Unassigned Pits

In the current Alcoa indicative mine plan, there exists a number of mining pits which are unassigned to a given year. These pits are, currently, unlikely to be developed at this stage but may be considered for development at a later date. These unassigned pits are shown in green in the upper left corner of Figure 4-1. As the mine pits are unassigned, the order (and year) in which the mine pits will be developed and subsequently mined is undefined. As a result of this, noise modelling results for these pits have been presented individually as developmental mining activities instead of a single summed value like those presented in the previous sections.

For the purpose of completeness, received noise levels at identified noise sensitive receptors have been predicted for mining and mine pit developmental activities at these unassigned pit locations. These results are presented in Table 6-4. Results presented in **bold text** denote predictions which exceed the Assigned Levels.

Table 6-4 : EPA Default Conditions Highest Predicted Noise Levels for the Myara North Mine Unassigned Pits

NSRs	EPA Default Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)			
	Mine Development Activities		Mining Activities	
	Day	Night	Day	Night
NSR1	17.7	12.4	-7.8	-7.0
NSR2	38.1	**38.2**	43.0	**43.0**
NSR3	34.9	34.0	23.9	24.1
NSR4	**46.7**	**46.6**	25.5	26
NSR5	34.9	34.8	21.6	22.2
NSR6	43.2	**43.1**	34.3	34.4
NSR7	42.2	**42.1**	28.2	28.6
NSR8	**48.0**	**48.0**	32.1	32.4
NSR9	44.3	**44.3**	31.7	32.1
NSR10	42.3	**42.2**	36.7	**37.0**
NSR11	39.8	**38.6**	37.8	**37.9**
NSR12	39.7	**39.4**	41.8	**42**
NSR13	**46.1**	**46.1**	36.7	**36.9**

NSRs	EPA Default Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)			
	Mine Development Activities		Mining Activities	
	Day	Night	Day	Night
NSR14	**51.0**	**51.0**	39.8	**39.9**
NSR15	**47.9**	**47.9**	43.1	**43.3**
NSR16	35.6	**35.4**	29.7	30.0
NSR17	38.0	**37.8**	32	32.2
NSR18	40.7	**40.5**	32.8	33
NSR19	37.5	**37.3**	31.3	31.6
NSR20	35.6	**35.4**	29.6	29.9
NSR21	34.7	34.4	20.2	20.8
NSR22	36.1	31.3	22.2	22.9
NSR23 Monadnocks Campsite	23.2	22.3	6.2	7.3
NSR24 Mt Cooke Campsite	31.5	30.9	1.8	2.4
NSR 25 Wungong Campsite	14.9	12.1	0.6	1.7

Note: Noise levels in **BOLD** denote predictions which exceed the night-time Assigned Levels (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays).

6.1.2 Holyoake Mine Development

The following noise model scenarios were investigated as part of the noise impact assessment for the development of the Holyoake mine region:

Table 6-5 : Noise Modelling Scenarios for Holyoake

Scenario	Year	Mining Activities	Fixed Plant Construction Activities
0	Pre-Year 1	Mine development activities in Year 1 pits	Fixed plant construction activities commence
1	Year 1	Mining operations in Year 1 pits and Mine construction activities in Year 2 pits	Fixed plant facilities commence operations

Scenario	Year	Mining Activities	Fixed Plant Construction Activities
2	Year 2	Mining operations in Year 2 pits, Mine development activities in Year 3 pits and rehabilitation activities	Fixed plant facilities continue operating
3	Year 3	Mining Operations in Year 3 pits, Mine development activities in Year 4 pits and rehabilitation activities	Fixed plant facilities continue operating
5	Year 4	Mining Operations in Year 4 pits, Mine development activities in Year 5 pits and rehabilitation activities	Fixed plant facilities continue operating
5	Year 5	Mining Operations in Year 5 pits and rehabilitation activities	Fixed plant facilities continue operating

6.1.2.1 Noise Level predictions

Noise contours for the various Holyoake scenarios are presented in APPENDIX D. Contours are presented for the day time and night time assigned noise levels at 45 dB(A) and 35 dB(A) respectively (see Section 2.2), and for 5 dBA lower to indicate potential for exceedance in the event of tonality (see Section 7.3).

Table 6-6 presents the highest predicted noise levels under the default weather conditions defined in *Draft Guideline: Assessment of Environmental Noise Emissions, Department of Water and Environmental Regulation, May 2021* at each of the selected receivers. The predicted levels represent the contribution of the activities within the proposed Myara North and Holyoake mine regions to overall noise levels and do not include noise emissions for existing plant and equipment. Results presented in **bold** text denote predictions which exceed the Assigned Levels.

Table 6-6 : EPA Default Day Time Conditions Predicted Noise Levels for the Holyoake Mine Scenarios (0700 hours to 1900 hours, Monday to Saturday)

NSRs	EPA Default Day Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR1	24.9	22.5	23.7	35.4	32.2	27.1
H-NSR2	25.7	23.2	23.9	36.7	33.1	27.7
H-NSR3	26.5	24.5	24.9	38.8	34.8	28.2
H-NSR4	26.9	24.6	24.8	39.0	34.5	27.8
H-NSR5	26.8	24.4	23.4	38.3	33.3	26.7
H-NSR6	28.3	25.6	23.5	39.5	33.8	26.7

NSRs	EPA Default Day Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR7	28.6	26.9	23.0	40.1*	33.4	25.7
H-NSR8	22.4	27.0	23.8	40.3*	33.0	25.3
H-NSR9	23	30.6	24.0	39.6	31.9	24.8
H-NSR10	36.2	30.1	25.7	35.6	28.4	24.5
H-NSR11	36.4	29.3	24.8	32.8	26.1	20.3
H-NSR12	33.2	29.1	26.9	29.4	24.5	24.5
H-NSR13	31	30.5	28.3	27.7	25.5	25.7
H-NSR14	32.7	28.7	27.4	24.1	23.7	23.8
H-NSR15	12.4	17.5	21.4	24.8	19.5	15.1
H-NSR16	22.5	16.1	17.5	14.5	19.4	13.4
H-NSR17	5.5	10.0	9.6	9.1	9.4	9.0
H-NSR18	11.9	15.3	14.2	11.6	12.1	10.5
H-NSR19	24.6	21.1	18.4	13.4	18.5	14.3
H-NSR20	22.9	18.6	16.9	13.5	17.5	13.4
H-NSR21	10	9.1	8.4	6.5	8.1	5.9
H-NSR22	22.8	20.8	17.4	13.8	17.0	14.1
H-NSR23	9.7	9.3	9.0	8.0	9.5	6.9
H-NSR24	9.4	8.1	7.7	9.9	12.8	6.0
H-NSR 25	11.9	17.6	17.5	16.1	16.2	15.3
H-NSR 26	20.2	18.9	18.7	16.7	17.9	14.6
H-NSR 27	19.7	19.3	19.3	17.0	17.9	15.1
H-NSR 28	21	18.0	17.4	15.1	16.0	15.2
H-NSR 29	20.3	20.5	20.5	18.5	19.2	16.6
H-NSR 30	19.7	20.4	20.5	18.6	19.2	16.9
H-NSR 31	19.3	19.3	19.3	17.2	18.0	15.7
H-NSR 32	18.8	19.2	19.4	17.5	18.1	15.5
H-NSR 33	18	19.2	19.3	17.7	18.2	16.1
H-NSR 34	7.8	12.3	12.1	11.8	12.1	11.5
H-NSR 35	4.4	15.3	12.9	10.7	10.4	8.8

NSRs	EPA Default Day Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR 36 ETMILYN TRAIL	39.1	35.5	23.0	16.0	20.1	14.0
H-NSR 37 INGLEHOPE	27.9	24.4	25.0	35.5	35.9	32.0
H-NSR 38 CHADORA CAMPSITE	23.6	30.0	30.3	20.3	23.9	24.5
H-NSR 39 Swamp Oak Campsite	14.7	13.1	15.0	13.2	14.7	11.0
H-NSR 40 Mt Wells Campsite	0.0	4.8	4.8	4.8	4.8	3.0
H-NSR 41 White Horse Hill Campsite	2.5	9.0	8.1	8.7	8.4	8.2

Note: Predicted noise levels denoted with an * indicate that they are exceeding the evening time Assigned Levels (1900 to 2200 hours all days).

Table 6-7 : EPA Default Night Time Conditions Predicted Noise Levels for the Holyoake Mine Scenarios (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays)

NSRs	EPA Default Night Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR1	25.7	23.4	24.5	**35.9**	32.8	27.8
H-NSR2	26.5	24.2	24.8	**37.2**	33.7	28.2
H-NSR3	27.2	25.3	25.7	**39.3**	35.3	28.8
H-NSR4	27.5	25.5	25.6	**39.5**	35.0	28.5
H-NSR5	27.5	25.2	24.3	**38.8**	33.8	27.4
H-NSR6	28.9	26.3	24.3	**39.9**	34.3	27.4
H-NSR7	29.2	27.4	23.8	**40.5**	33.9	26.3
H-NSR8	22.8	27.3	24.6	**40.7**	33.5	25.9
H-NSR9	23.4	31.0	24.7	**40.0**	32.5	25.5

NSRs	EPA Default Night Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR10	**36.6**	30.4	26.4	**36.1**	29.2	25.4
H-NSR11	**36.8**	29.8	25.7	33.4	26.9	21.2
H-NSR12	33.7	29.7	27.7	30.2	24.9	25.4
H-NSR13	31.6	31.1	29.1	28.4	25.8	26.7
H-NSR14	33.3	29.4	28.4	25.1	24.0	24.7
H-NSR15	13.1	18.5	22.5	25.7	20.6	16.1
H-NSR16	23.3	16.8	18.6	15.5	20.3	14.4
H-NSR17	6.3	11.0	10.6	10.2	10.5	10.1
H-NSR18	12.6	16.3	15.1	12.6	13.1	11.6
H-NSR19	25.4	22.0	19.5	14.3	19.5	15.2
H-NSR20	23.8	19.5	18.0	14.6	18.5	14.4
H-NSR21	10.6	9.8	9.3	7.5	9.0	6.9
H-NSR22	23.6	21.7	18.5	14.9	18.1	15.2
H-NSR23	10.4	10.1	9.9	8.9	10.4	7.8
H-NSR24	10.1	8.8	8.4	10.9	13.8	6.8
H-NSR 25	12.7	18.8	18.6	17.3	17.4	16.5
H-NSR 26	21.2	19.9	19.7	17.8	19.0	15.7
H-NSR 27	20.7	20.4	20.5	18.2	19.0	16.3
H-NSR 28	22	19.0	18.5	16.2	17.1	16.3
H-NSR 29	21.3	21.5	21.6	19.6	20.3	17.8
H-NSR 30	20.7	21.5	21.5	19.7	20.3	18.1
H-NSR 31	20.4	20.4	20.4	18.3	19.1	16.8
H-NSR 32	19.8	20.3	20.4	18.5	19.1	16.6
H-NSR 33	19	20.3	20.4	18.8	19.3	17.3
H-NSR 34	8.6	13.3	13.1	12.8	13.1	12.6
H-NSR 35	5.1	16.4	13.8	11.7	11.3	9.8
H-NSR 36 ETMILYN TRAIL RAIL SIDING	**39.4**	**35.8**	23.9	16.9	20.8	14.8

NSRs	EPA Default Night Time Conditions Highest Predicted Noise Level at Noise Sensitive Receivers, dB(A)					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR 37 Inglehope	28.7	25.2	25.9	**36.1**	**36.4**	32.4
H-NSR 38 Chadora Campsite	24.4	30.7	31.0	21.4	24.2	25.5
H-NSR 39 Swamp Oak Campsite	15.8	14.0	16.0	14.2	15.6	12.0
H-NSR 40 Mt Wells Campsite	0	4.8	4.8	4.8	4.8	3.0
H-NSR 41 White Horse Hill Campsite	3.4	10.0	9.0	9.7	9.3	9.1

Note: Noise levels in **BOLD** denote predictions which exceed the night-time Assigned Levels (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays).

6.2 Blast Noise Impact Area Prediction

Wood mobilised to Alcoa's existing Huntly mine operations in the Myara region to measure the noise from their blasting activities in order to derive an empirical assessment criterion based on current operational practices. The new Myara North mine is expected to employ criteria and blast methodology that is similar to that currently practiced in Myara.

The results of the measurements are as shown in Table 6-8.

Table 6-8 : Blast Overpressure Measurement Results from Alcoa's Existing Huntly Mine Operations in the Myara Region

Monitor	Distance from Blast Center, m	Maximum Instantaneous Charge, kg	Measured Peak Noise Level, dB(L)
Blast 1 (Ausdrill)			
1	1,390	9 kg per hole, 762 holes	116.8
2	2,780		107.0
3	5,560		91.8
Blast 2 (Alcoa)			
1	1,090	7 kg per hole, 40 holes	116.4
2	2,180		107.0
3	4,360		98.8

The onsite blast measurement data can be translated into the following graphs as shown in Figure 6-1.

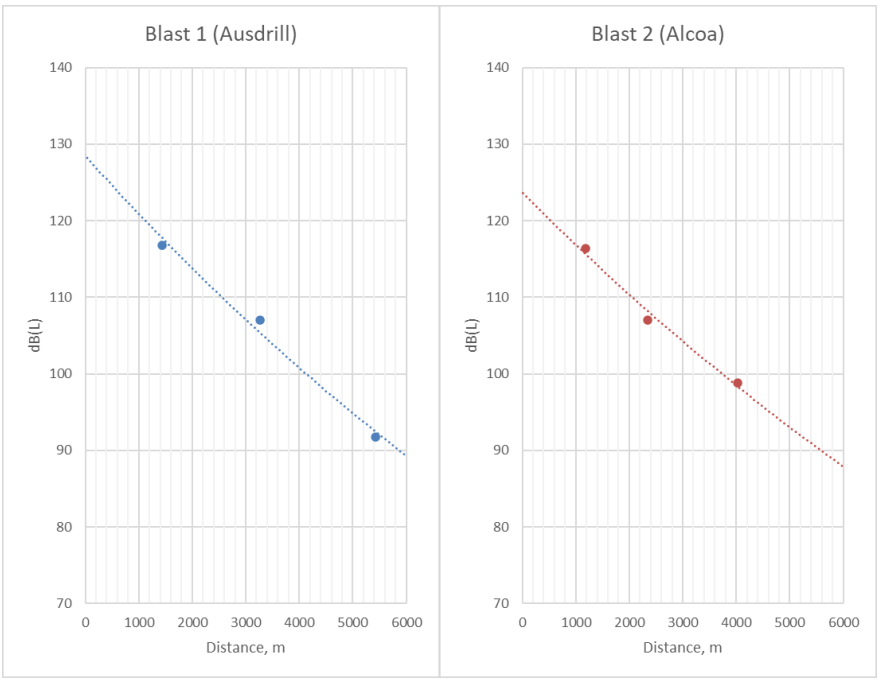


Figure 6-1 Graphs Showing the Derived 'Site Constant' for Blast Noise Based on Measurements at Alcoa's Myara North Mine

The recommended peak sound pressure from blasting to avoid human discomfort is provided in Section 11 of the Regulations and is summarised as follows:

Type of Building / Structure	Peak sound pressure level [dB(L)]
Sensitive site (residential buildings, theatres, schools, and other similar buildings occupied by people)	115 dB(L) for 95 per cent of blasts per year 120 dB(L) maximum
Occupied non-sensitive sites, such as factories and commercial premises	125 dB(L) maximum

Based on the results of Blast 1 (Table 6-8), peak noise level of 120 dB(L) is expected to be encountered approximately 1.2 km from the blast center.

6.2.1 Ground Borne Vibration

Guidance provided within APPENDIX J of AS 2187.2 recommends a limit of 5 mm/s peak vibration level to avoid damage to building and surrounding structures.

Based on the charge weight of 9kg the blasting measured at Alcoa's existing Huntly mine in the Myara region, and using ground borne vibration estimation guidance provided in AS 2187.2 APPENDIX J, the calculated distance for ground borne vibration to attenuate below the 5 mm/s criteria is shown in Table 6-9.

Table 6-9 : Calculated Distance for Ground Borne Vibration to Attenuate to Levels Below the 5 mm/s Criteria

Blast ID	Maximum Instantaneous Charge[13] Weight, kg	Distance to Attenuate to below 5 mm/s, m
Blast 1 (AustDrill)	9 kg	212 m
Blast 2 (Alcoa)	7 kg	188 m

[13] Total charge weight detonated within a 8 ms window.

7 RESULTS ASSESSMENT

7.1 Compliance Assessment

The results of the modelling assessment show that received noise levels at most NSRs will comply with the Assigned Levels for the majority of the time and weather conditions. Under worst case meteorological conditions, some NSRs are at risk of exceeding the Assigned levels especially if mining and mine developmental activities take place simultaneously and in close proximity to each other during the night time hours.

7.1.1 Day Time Assigned Levels

The results of the modelling (based on the noise sensitivity map in Section 5.2) presented in Section 6.1 indicate that the mining component of the Proposal can comply with the Assigned Levels at the nearby noise sensitive receptors during the day at the Myara North and Holyoake mine regions.

7.1.2 Night-Time Assigned Levels

For Myara North, the predicted night-time noise levels show that NSR 15 (rural property along Balmoral Road, east of Jarrahdale) and NSR 25 (Wungong Campsite on the Munda Biddi Trail) have the highest potential to be impacted by operational noise during mining and development of pits close to these receivers during the 2025 – 2028 modelled operational years. At these two NSRs there is the potential for an exceedance of night time Assigned Levels under worst case meteorological conditions.

For Holyoake mine region, the noise levels from mine development activities in mine blocks closest to the NSRs at Inglehope and the Etmilyn Trail Rail Siding are currently predicted to potentially exceed the Assigned Levels during operation Year 1, 4 and 5 during worst case meteorological conditions.

7.1.3 Historical Weather Breakdown

The likelihood of weather conditions that could result in noise emissions exceeding the night-time noise limit (35 dB(A)) was assessed. Wind and rainfall data from the Bureau of Meteorological (BOM) Dwellingup meteorological station[14] was analysed to determine the percentage of 'high-risk' conditions, defined as periods where:

- Calm - The wind is from any direction and the wind speed is less than 0.5 metres per second, indicative of highly stable atmospheric conditions during which, when air temperature

[14] Data from the last 5 years (1st January 2016 to 31st December 2020) was included

increases with height, noise that would otherwise propagate away from the ground can refract (bend) downward and contribute to the noise level at the receiver; or

- Laminar Air Flow - The wind direction is from the mining locations and the wind speed is less than 3 metres per second, indicative of conditions when atmospheric turbulence is low and variation in windspeed with height can cause noise to refract and contribute to the noise level the receiver; and

- Noise emissions could be assessed - No rainfall was recorded, which in combination with the wind conditions above, would enable the noise level at the receiver to be measured and assessed in accordance with the Noise Regulations (1997).

Conditions causing noise exceedances at long distances from the noise source are highly dependent on the occurrence of specific vertical wind and temperature profiles which can cause sound to refract downward. The occurrence of these conditions has not been captured by the Dwellingup BOM weather station and are typically not practical to measure without deployment of specialist equipment[15]. Due to the significance of vertical temperature and wind profiles on noise propagation, and the requirement for these conditions to enhance noise in order to cause noise to propagate long distances, the frequency of noise exceedances is anticipated to be less than the identified occurrence of high-risk conditions.

The results of the analysis are presented in Table 7-1 to Table 7-3.

Table 7-1 : Percentage of High Risk Conditions for Noise Propagation Towards the Mt Cooke, Monadnocks and Wungong Campsite Receivers by Seasonal Periods

Period	Risk of high risk conditions in last 5 years (per cent)			
	Summer	Autumn	Winter	Spring
Day	4	6	10	7
Evening	5	6	10	10
Night	3	6	7	7

Table 7-2 : Percentage of High Risk Conditions for Noise Propagation Towards the Jarrahdale & Serpentine Dam Receivers by Seasonal Periods

Period	Risk of high risk conditions in last 5 years (per cent)			
	Summer	Autumn	Winter	Spring
Day	6	8	12	7
Evening	1	2	7	4
Night	2	3	9	6

[15] Measurement of atmospheric vertical temperature and wind profiles requires either deployment of weather balloons or a combination of SODAR (Sonic Detection And Ranging) and RASS (Radio Acoustic Sounding System) equipment.

Table 7-3 : Percentage of High Risk Conditions for Noise Propagation Towards Holyoake Receivers[16] by Seasonal Periods

Period	Risk of high risk conditions in last 5 years (per cent)			
	Summer	Autumn	Winter	Spring
Day	1	1	3	1
Evening	0	1	3	1
Night	1	1	3	2

7.2 Blast Noise & Ground Borne Vibration

7.2.1 Blast Noise

Figure 7-1 shows the indicative Myara North mine pits located within 1.2 km of the nearby noise sensitive receivers where blasting noise have the potential to exceed the maximum limit defined in Section 11 of the Regulations.

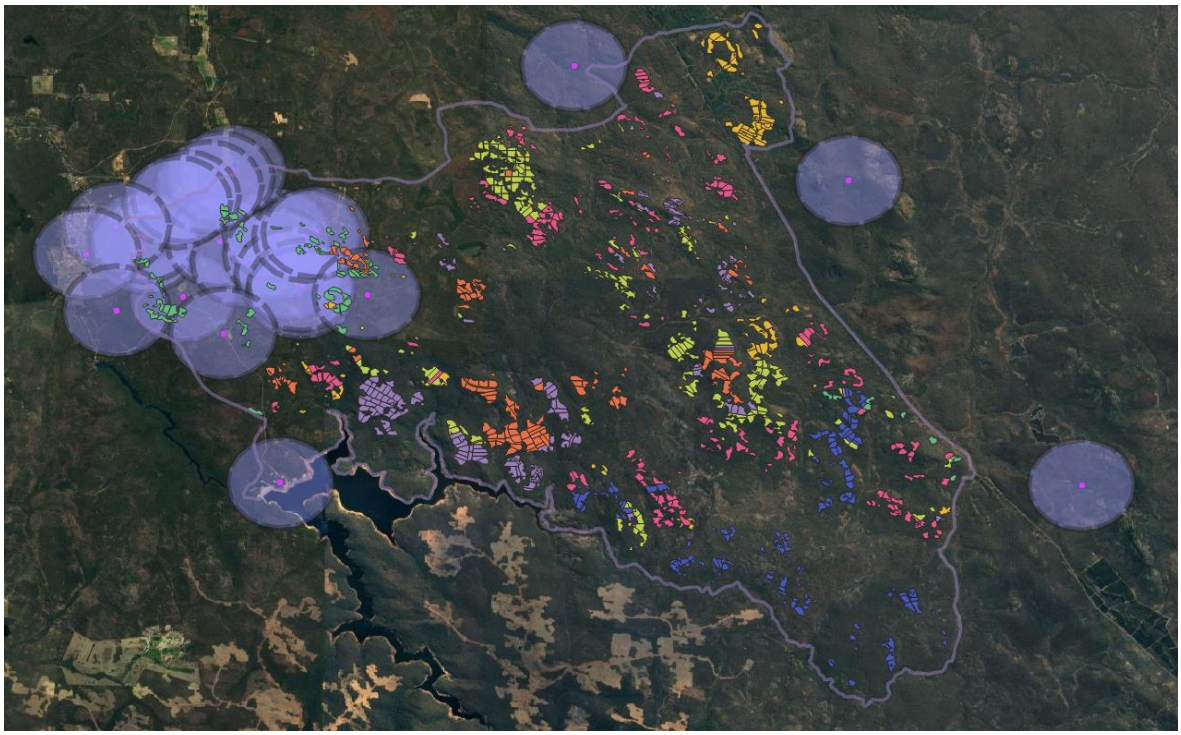


Figure 7-1 Myara North Mining Pit Where Blast Noise Have the Potential to Exceed the 120 dB(L) Maximum

[16] The percentage of shown is the sum of periods where high risk conditions persist for incident wind within a 122 degree arc. (i.e. wind blowing towards the receivers). Variability between individual receivers in close proximity are likely to be low.

The Myara North mining pits that may potentially cause an exceedance of the maximum 120 dB(L) limit are primarily mining pits that are currently unassigned and in the vicinity of rural properties along Balmoral Road and Kingsbury Drive (with a small number of 2025 and 2029 pits). These pits are also located within or very close to Restricted day time mining zones.

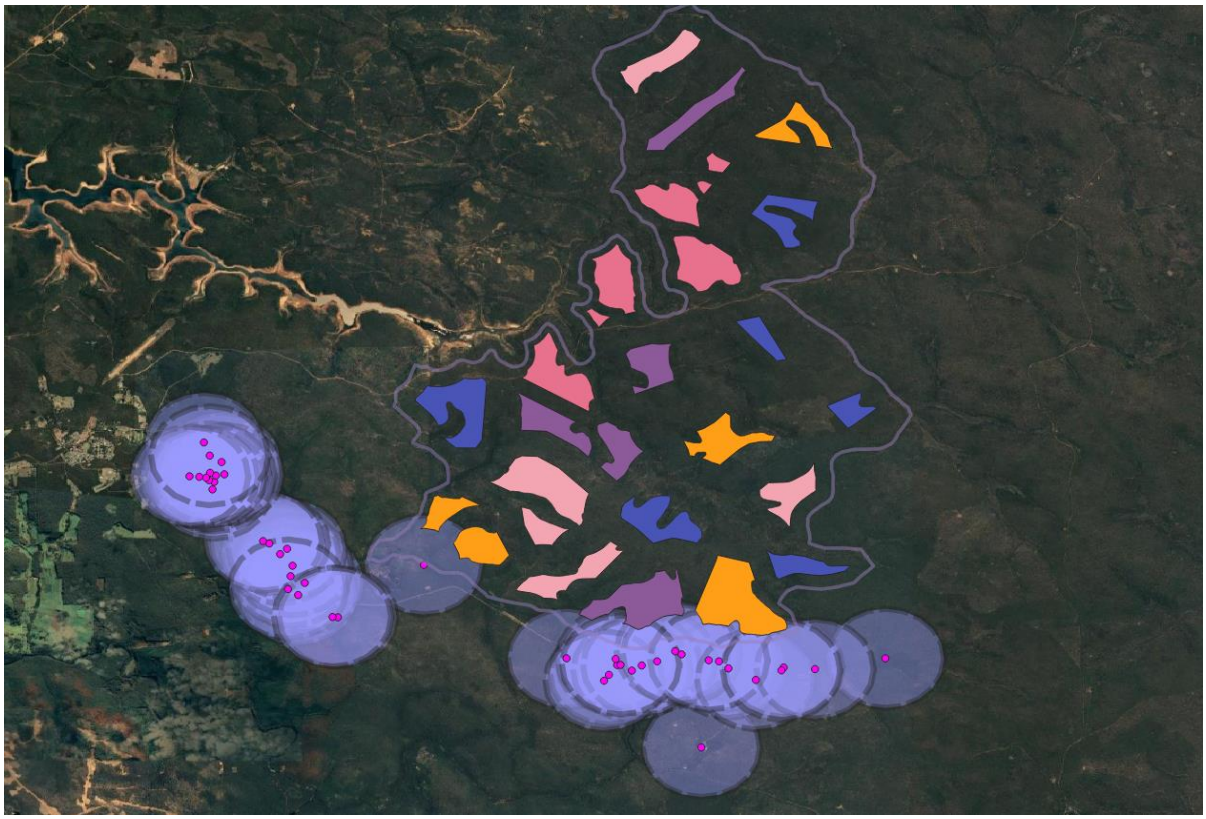


Figure 7-2 Holyoake Mining Blocks Where Blast Noise Have the Potential to Exceed the 120 dB(L) Maximum

For the proposed Holyoake region, the blasting in blocks closest to the NSRs at Inglehope and the Etmilyn Trail have the potential to exceed the 120 dB(L) maximum limit.

Alcoa manages blast noise through a module within their Integrated Noise Management tool and has established an internal standard with a maximum blast noise level of 115 dB(L). Alcoa blast management practices include noise level prediction which is undertaken during the lead up to the actual blast and incorporates the mine configuration at that time. This informs the blast planning and is used to minimise impacts.

Alcoa also employs a number of different blasting techniques and management initiatives to minimise the impact of blast noise when required. Lower noise techniques that Alcoa may use include the following:

- stemming arrangements, currently used in blasting around noise sensitive receivers, where imported blue metal fill material is put in the top of the blast hole to divert blast noise into the ground instead of riffling out of the holes; and

- mechanical fracturing which could include various methods such as ripping using mobile equipment.

7.2.2 Ground Borne Vibration

From the calculations in Section 6.2.1, based on the blasting plan on the day the blast noise measurements were conducted at Alcoa's existing Myara region operations, the calculated distances for ground borne vibration levels to attenuate to below 5 mm/s are 212 m and 188 m for a 9 kg and 7 kg charge respectively. It is very likely the safety exclusion zone for a blasting event will exceed these distances from the blast centre. Therefore, ground borne vibration is expected to be insignificant at the all the nearby NSRs (including recreational campsites) for the proposed Myara North and Holyoake mine regions.

7.3 Risk of tonality

Many of the items of mobile equipment are likely to have some element of tonality. And, if individual items are discernible at the receiver, there is a higher potential for tonal characteristics. However, this tonality may not always be evident at the receiver for the following reasons:

- Tonality may not protrude above ambient noise;
- Tonality from particular items of equipment may be masked by noise received from other equipment;
- The level of noise emissions from items of mobile equipment will vary depending on their locations (which may be continuously changing), depths and heights; and
- The severity and pitch of the tonality from mobile equipment will change depending on operating conditions.

Prediction of tonality at receptors from mine site mobile equipment fleet is impractical. Instead, to address the potential of tonality, the results indicate where predicted levels are within 5 dB of the assigned levels. This shows where, if tonality was present, the predicted levels would exceed the assigned levels.

Table 7-4 to Table 7-7 below present the risk of exceedance due to tonality. APPENDIX C and APPENDIX D presents noise contours 5 dBA below the assigned noise levels to indicate the potential for exceedance in the event of tonality.

Table 7-4 : Risk of Exceedance of the Assigned Levels due to Tonality for the Day Time Myara North Mine Scenarios (0700 hours to 1900 hours, Monday to Saturday)

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Day Time Myara North Mine Scenarios						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR1	NO	NO	NO	NO	NO	NO	NO

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Day Time Myara North Mine Scenarios						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR2	NO	NO	NO	NO	NO	NO	NO
NSR3	NO	NO	NO	NO	NO	NO	NO
NSR4	NO	NO	NO	NO	NO	NO	NO
NSR5	NO	NO	NO	NO	NO	NO	NO
NSR6	NO	NO	NO	NO	NO	NO	NO
NSR7	NO	NO	NO	NO	NO	NO	NO
NSR8	NO	NO	NO	NO	NO	NO	NO
NSR9	NO	NO	NO	NO	NO	NO	NO
NSR10	NO	NO	NO	NO	NO	NO	NO
NSR11	NO	NO	**YES**	NO	**YES**	**YES**	NO
NSR12	NO	NO	NO	NO	NO	NO	NO
NSR13	NO	NO	NO	NO	NO	NO	NO
NSR14	NO	NO	NO	NO	NO	NO	NO
NSR15	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**
NSR16	NO	NO	NO	NO	NO	NO	NO
NSR17	NO	NO	NO	NO	NO	NO	NO
NSR18	NO	NO	NO	NO	NO	NO	NO
NSR19	NO	NO	NO	NO	NO	NO	NO
NSR20	NO	NO	NO	NO	NO	NO	NO
NSR21	NO	NO	NO	NO	NO	NO	NO
NSR22	NO	NO	NO	NO	NO	NO	NO
NSR23	NO	NO	NO	NO	NO	NO	NO
NSR24	NO	NO	NO	NO	NO	NO	NO
NSR 25	NO	NO	NO	NO	NO	**YES**	**YES**

Table 7-5 : Risk of Exceedance of the Assigned Levels due to Tonality for the Night Time Myara North Mine Scenarios (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays)

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Night Time Myara North Mine Scenarios						
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G
NSR1	NO	NO	NO	NO	NO	NO	NO
NSR2	NO	NO	NO	NO	NO	NO	NO
NSR3	NO	NO	NO	NO	NO	NO	NO
NSR4	NO	NO	NO	NO	NO	NO	NO
NSR5	NO	NO	NO	NO	NO	NO	NO
NSR6	NO	NO	NO	NO	NO	NO	NO
NSR7	NO	NO	NO	NO	NO	NO	NO
NSR8	NO	NO	NO	NO	NO	NO	NO
NSR9	NO	NO	NO	NO	NO	NO	NO
NSR10	NO	NO	NO	NO	NO	NO	**YES**
NSR11	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**
NSR12	NO	NO	**YES**	**YES**	NO	**YES**	**YES**
NSR13	NO	NO	**YES**	NO	NO	**YES**	NO
NSR14	NO	NO	**YES**	NO	NO	**YES**	NO
NSR15	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**
NSR16	NO	NO	NO	NO	NO	NO	NO
NSR17	NO	NO	NO	NO	NO	NO	NO
NSR18	NO	NO	NO	NO	NO	NO	NO
NSR19	NO	NO	NO	NO	NO	NO	NO
NSR20	NO	NO	NO	NO	NO	NO	NO
NSR21	NO	NO	NO	NO	NO	NO	NO
NSR22	NO	NO	NO	NO	NO	NO	NO
NSR23	NO	NO	**YES**	**YES**	NO	NO	**YES**
NSR24	NO	NO	NO	**YES**	NO	NO	NO
NSR 25	NO	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

Table 7-6 : Risk of Exceedance of the Assigned Levels due to Tonality for the Day Time Holyoake Mine Scenarios (0700 hours to 1900 hours, Monday to Saturday)

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Day Time Holyoake Mine Scenarios					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR1	NO	NO	NO	NO	NO	NO
H-NSR2	NO	NO	NO	NO	NO	NO
H-NSR3	NO	NO	NO	NO	NO	NO
H-NSR4	NO	NO	NO	NO	NO	NO
H-NSR5	NO	NO	NO	NO	NO	NO
H-NSR6	NO	NO	NO	NO	NO	NO
H-NSR7	NO	NO	NO	**YES**	NO	NO
H-NSR8	NO	NO	NO	**YES**	NO	NO
H-NSR9	NO	NO	NO	NO	NO	NO
H-NSR10	NO	NO	NO	NO	NO	NO
H-NSR11	NO	NO	NO	NO	NO	NO
H-NSR12	NO	NO	NO	NO	NO	NO
H-NSR13	NO	NO	NO	NO	NO	NO
H-NSR14	NO	NO	NO	NO	NO	NO
H-NSR15	NO	NO	NO	NO	NO	NO
H-NSR16	NO	NO	NO	NO	NO	NO
H-NSR17	NO	NO	NO	NO	NO	NO
H-NSR18	NO	NO	NO	NO	NO	NO
H-NSR19	NO	NO	NO	NO	NO	NO
H-NSR20	NO	NO	NO	NO	NO	NO
H-NSR21	NO	NO	NO	NO	NO	NO
H-NSR22	NO	NO	NO	NO	NO	NO
H-NSR23	NO	NO	NO	NO	NO	NO
H-NSR24	NO	NO	NO	NO	NO	NO
H-NSR 25	NO	NO	NO	NO	NO	NO
H-NSR 26	NO	NO	NO	NO	NO	NO
H-NSR 27	NO	NO	NO	NO	NO	NO

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Day Time Holyoake Mine Scenarios					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR 28	NO	NO	NO	NO	NO	NO
H-NSR 29	NO	NO	NO	NO	NO	NO
H-NSR 30	NO	NO	NO	NO	NO	NO
H-NSR 31	NO	NO	NO	NO	NO	NO
H-NSR 32	NO	NO	NO	NO	NO	NO
H-NSR 33	NO	NO	NO	NO	NO	NO
H-NSR 34	NO	NO	NO	NO	NO	NO
H-NSR 35	NO	NO	NO	NO	NO	NO
H-NSR 36 ETMILYN TRAIL	NO	NO	NO	NO	NO	NO
H-NSR 37 INGLEHOPE	NO	NO	NO	NO	NO	NO
H-NSR 38 CHADORA CAMPSITE	NO	NO	NO	NO	NO	NO
H-NSR 39 Swamp Oak Campsite	NO	NO	NO	NO	NO	NO
H-NSR 40 Mt Wells Campsite	NO	NO	NO	NO	NO	NO
H-NSR 41 White Horse Hill Campsite	NO	NO	NO	NO	NO	NO

Table 7-7 : Risk of Exceedance of the Assigned Levels due to Tonality for the Night Time Holyoake Mine Scenarios (2200 Hours to 0700 hours Monday to Saturday, 2200 Hours to 0900 hours Sunday and Public Holidays)

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Night Time Holyoake Mine Scenarios					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR1	NO	NO	NO	**YES**	**YES**	NO

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Night Time Holyoake Mine Scenarios					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR2	NO	NO	NO	**YES**	**YES**	NO
H-NSR3	NO	NO	NO	**YES**	**YES**	NO
H-NSR4	NO	NO	NO	**YES**	**YES**	NO
H-NSR5	NO	NO	NO	**YES**	**YES**	NO
H-NSR6	NO	NO	NO	**YES**	**YES**	NO
H-NSR7	NO	NO	NO	**YES**	**YES**	NO
H-NSR8	NO	NO	NO	**YES**	**YES**	NO
H-NSR9	NO	YES	NO	**YES**	**YES**	NO
H-NSR10	**YES**	YES	NO	**YES**	NO	NO
H-NSR11	**YES**	NO	NO	**YES**	NO	NO
H-NSR12	**YES**	NO	NO	**YES**	NO	NO
H-NSR13	**YES**	**YES**	NO	NO	NO	NO
H-NSR14	**YES**	NO	NO	NO	NO	NO
H-NSR15	NO	NO	NO	NO	NO	NO
H-NSR16	NO	NO	NO	NO	NO	NO
H-NSR17	NO	NO	NO	NO	NO	NO
H-NSR18	NO	NO	NO	NO	NO	NO
H-NSR19	NO	NO	NO	NO	NO	NO
H-NSR20	NO	NO	NO	NO	NO	NO
H-NSR21	NO	NO	NO	NO	NO	NO
H-NSR22	NO	NO	NO	NO	NO	NO
H-NSR23	NO	NO	NO	NO	NO	NO
H-NSR24	NO	NO	NO	NO	NO	NO
H-NSR 25	NO	NO	NO	NO	NO	NO
H-NSR 26	NO	NO	NO	NO	NO	NO
H-NSR 27	NO	NO	NO	NO	NO	NO
H-NSR 28	NO	NO	NO	NO	NO	NO
H-NSR 29	NO	NO	NO	NO	NO	NO
H-NSR 30	NO	NO	NO	NO	NO	NO

NSRs	Risk of Exceedance of the Assigned Levels due to Tonality for the Night Time Holyoake Mine Scenarios					
	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
H-NSR 31	NO	NO	NO	NO	NO	NO
H-NSR 32	NO	NO	NO	NO	NO	NO
H-NSR 33	NO	NO	NO	NO	NO	NO
H-NSR 34	NO	NO	NO	NO	NO	NO
H-NSR 35	NO	NO	NO	NO	NO	NO
H-NSR 36 ETMILYN TRAIL	**YES**	**YES**	NO	NO	NO	NO
H-NSR 37 INGLEHOPE	NO	NO	NO	**YES**	**YES**	**YES**
H-NSR 38 CHADORA CAMPSITE	NO	**YES**	**YES**	NO	NO	NO
H-NSR 39 Swamp Oak Campsite	NO	NO	NO	NO	NO	NO
H-NSR 40 Mt Wells Campsite	NO	NO	NO	NO	NO	NO
H-NSR 41 White Horse Hill Campsite	NO	NO	NO	NO	NO	NO

7.4 Audibility Assessment

For mining noise to be audible at the noise sensitive locations, it must first protrude sufficiently above ambient baseline levels. To assess the likelihood of operational noise from Alcoa's mining operations being audible at the NSRs, the model predicted noise levels are compared against the monitored baseline noise levels.

Mining noise is assessed as audible if the model predicted values protrude above the ambient monitoring data by more than 3 dB. It is not typical for a person to audibly detect a change in noise levels below a 2 to 3 dB range (depending upon the person and frequency content of the noise). However, some aspects of the operations may still be perceivable, as a frequency shift or when tonality is present.

Audibility of mining noise at the NSRs is expected to be lower during weather conditions that are less conducive for noise propagation (e.g. during warmer periods and periods without temperature inversions) outside of the EPA default weather parameters. Additionally, the audibility of mining noise is more likely to masked during the daytime periods due to typically higher ambient noise levels. Contours showing the indicative level for audibility of mining noise are presented in APPENDIX E and APPENDIX F.

Table 7-8 Audibility of Day time Mining Operations at Myara North NSRs with Noise Monitoring Baseline

Relevant Noise Sensitive Receptors (NSRs)	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Highest Predicted Noise Levels, dB(A)	Likelihood that Operational Noise is Audible
NSR1	20.1-33.4	44.9-53.4	24.4	NO
NSR3	23.2-39.4	48.0-56.0	19.8	NO
NSR14	24.5-34.3	38.9-55.8	33.9	YES
NSR18	23.7-43.1	47.6-59.2	25.7	NO
NSR20	25.5-37	44.5-56.3	26.3	NO
NSR21	20.1-40.6	35.9-55.7	24.1	NO
NSR22	21.2-34.6	37.5-49.6	24.2	NO
NSR 23 – Monadnocks Campsite*	19.9-35.5	33.4-52.5	35.3	YES
NSR24 – Mt Cooke Campsite	19.9-35.5	33.4-52.5	31.9	YES
NSR 25 – Wungong Campsite*	19.9-35.5	33.4-52.5	43.5	YES

Note: Ambient baseline monitoring was not undertaken for the NSRs denoted with an asterisk (*) due to their distance from the Holyoake mining regions development boundary. The ambient noise values shown in the table above are results from NSR 24 (Closest monitored location to the unmonitored campsites with similar type of use) and is used to provide an indicative ambient noise levels for assessment of audibility.

Table 7-9 Audibility of Night time Mining Operations at Myara North NSRs with Noise Monitoring Baseline

Relevant Noise Sensitive Receptors (NSRs)	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Highest Predicted Noise Levels, dB(A)	Likelihood that Operational Noise is Audible
NSR1	17.5-37.9	19.8-52.2	23.9	NO
NSR3	19.1-29.1	25.2-50.7	13.1	NO
NSR14	21.1-39.8	30.4-57.2	30.6	YES
NSR18	22.5-32.3	33.5-51.2	22.6	NO
NSR20	20.1-30.7	31.8-56	20.7	NO
NSR21	17.6-46.1	24.0-58.2	18.6	NO
NSR22	18-29.9	27.6-45.1	17.5	NO
NSR 23 – Monadnocks Campsite*	18.0-29.9	27.6-45.1	34.9	YES
NSR24 – Mt Cooke Campsite	18.0-29.9	27.6-45.1	31.6	YES
NSR 25 – Wungong Campsite*	18.0-29.9	27.6-45.1	37.5	YES

Note: Ambient baseline monitoring was not undertaken for the NSRs denoted with an asterisk (*) due to their distance from the Holyoake mining regions development boundary. The ambient noise values shown in the table above are results from NSR 24 (Closest monitored location to the unmonitored campsites with similar type of use) and is used to provide an indicative ambient noise levels for assessment of audibility.

The Nerang and Canning campsites on the Bibbulmun Track are located approximately 6.5 kms and 10.5 kms from the edge of the proposed Myara North mining region DE. Due to the significant distances, it is unlikely that mining noise is expected to be audible at these locations.

Table 7-10 Audibility of Day time Mining Operations at Holyoake NSRs with Night Monitoring Baseline

Relevant Noise Sensitive Receptors (NSRs)	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Highest Predicted Noise Levels, dB(A)	Likelihood that Operational Noise is Audible
H-NSR4	25.9-36.2	46.4-57.3	39.0	YES
H-NSR10	18.7-31.0	30.8-53.3	36.2	YES
H-NSR13	18.5-34.2	30.8-54.3	31.0	YES
H-NSR16	24.0-41.8	48.4-57.8	22.5	NO
H-NSR17-24	29.8-37.4	48.6-58.8	24.6	NO
H-NSR25-35	25.1-34.7	37.6-53.4	20.5	NO
H-NSR36	19.2-39.7	37.7-55.1	39.1	YES
H-NSR37 Inglehope	21.4-46.1	50.7-61.0	35.9	YES
H- NSR 38 Chadora Campsite*	21.4-46.1	50.7-61.0	30.3	YES
H-NSR 39 Swamp Oak Campsite*	21.4-46.1	50.7-61.0	15.0	NO
H-NSR 40 Mt Wells Campsite*	21.4-46.1	50.7-61.0	4.8	NO
H-NSR 41 White Horse Hills*	21.4-46.1	50.7-61.0	9.0	NO

Note: Ambient baseline monitoring was not undertaken for the NSRs denoted with an asterisk (*) due to their distance from the Holyoake mining regions development boundary. The ambient noise values shown in the table above are results from H-NSR 13 (Closest rural property in Inglehope to the unmonitored campsites) and is used to provide an indicative ambient noise levels for assessment of audibility.

Table 7-11 Audibility of Night time Mining Operations at Holyoake NSRs with Night Monitoring Baseline

Relevant Noise Sensitive Receptors (NSRs)	L90 Noise Levels, dB(A)	L10 Noise Levels, dB(A)	Highest Predicted Noise Levels, dB(A)	Likelihood that Operational Noise is Audible
H-NSR4	19.1-25.8	30.9-45.7	39.5	YES
H-NSR10	16.6-23.6	23.1-47.2	36.6	YES
H-NSR13	17.6-24.7	19.0-49.2	31.6	YES
H-NSR16	18.8-32.8	35.9-54.6	23.3	NO
H-NSR17-24	20.4-42.1	40.7-57.7	25.4	NO
H-NSR25-35	22.7-37.2	30.5-51.6	21.6	NO
H-NSR36	17.2-26.5	24.4-49.7	39.4	YES
H-NSR37 Inglehope	17.8-35.6	36.4-57.6	36.4	YES
H- NSR 38 Chadora Campsite*	17.8-35.6	36.4-57.6	31.0	YES
H-NSR 39 Swamp Oak Campsite*	17.6-24.7	19.0-49.2	16.0	NO
H-NSR 40 Mt Wells Campsite*	17.6-24.7	19.0-49.2	4.8	NO
H-NSR 41 White Horse Hills*	17.6-24.7	19.0-49.2	10.0	NO

Note: Ambient baseline monitoring was not undertaken for the NSRs denoted with an asterisk (*) due to their distance from the Holyoake mining regions development boundary. The ambient noise values shown in the table above are results from H-NSR 13 (Closest rural property in Inglehope to the unmonitored campsites) and is used to provide an indicative ambient noise levels for assessment of audibility.

8 CONSTRUCTION NOISE MANAGEMENT

Construction noise is typically exempted from meeting the Assigned Levels. A general overview of noise management measures likely to be required during construction activities is provided below.

8.1.1 Noise Management Requirements for Daytime Construction Activities

The Environmental Protection Noise Regulations 1997 state that for construction work carried out between 7am and 7pm on any day, which is not a Sunday or public holiday the assigned noise levels do not apply provided that:

- The construction work is carried out in accordance with control of noise practices set out in Section 6 of Australian Standard 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites"; and
- The equipment used for the construction is the quietest reasonably available.

The Chief Executive Officer[17] (CEO) may request that a noise management plan be submitted for the construction work at any time.

8.1.2 Noise Management Requirements for Out of Hours Construction Activities

For construction work done outside daytime hours or on Sundays and public holidays:

- The construction work must be carried out in accordance with control of noise practices set out in Section 6 of Australian Standard 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites"; and
- The equipment used for the construction must be the quietest reasonably available.

Furthermore, if noise emissions are likely to exceed the assigned noise levels then:

- The contractor must advise all nearby occupants or other sensitive receptors who are likely to receive noise levels which fail to comply with the standard under Regulation 7, of the work to be done at least 24 hours before it commences;
- The contractor must show that it was reasonably necessary for the work to be done out of hours; and

[17] The power of the CEO of the Department of Water and Environmental Regulation is delegated under the noise regulations to the CEOs of all local governments in the State of Western Australia.

- The contractor must submit to the CEO a Noise Management Plan at least seven days before the work starts, and the plan must be approved by the CEO. The plan must include details of:
    - Need for the work to be done out of hours;
    - Types of activities which could be noisy;
    - Predictions of the noise levels;
    - Control measures for noise and vibration;
    - Procedures to be adopted for monitoring noise emissions; and
    - Complaint response procedures to be adopted.

9 CONCLUSION

The results of the predictive modelling of noise emissions from operational equipment within the proposed Myara North and Holyoake mine regions demonstrate that:

- Compliance with the daytime Assigned Levels for the NSRs surrounding both mine regions is predicted;
- It is anticipated that emissions associated with the night time mining activities at the Myara North and Holyoake regions can be effectively controlled through the implementation of noise controls and operational planning practices to achieve compliance with the Assigned Levels and to minimise noise impacts;
- Without appropriate controls/ management, predicted noise levels under default worst case weather conditions[18] are expected to exceed the night-time Assigned Levels at some receivers at the Myara North and Holyoake mine regions;
    - For the Myara North mine region, NSR 15 (rural property along Balmoral Road, east of Jarrahdale) and NSR 25 (Wungong campsite on the Munda Biddi Trail) are predicted to exceed the night-time Assigned Levels during the modelled 2025 – 2028 operational years when mining and pit development activities are being conducted simultaneously in close proximity. The noise assessment indicates that Assigned Levels are unlikely to be exceeded at NSRs in the townsite of Jarrahdale (represented by NSRs 4, 5 20 and 21).
    - For the Holyoake region, the highest predicted noise levels suggest potential exceedances of the Assigned Levels at H-NSRs 1 – 11, 36 and 37 (Rural properties at Inglehope, along Pinjarra-Williams Road; Etmilyn Trail). The noise assessment indicates that Assigned Levels are unlikely to be exceeded at NSRS in the townsite of Dwellingup or rural properties at Etmilyn (H-NSR 16 – 24).
    - Analysis of historical weather data indicate that the adverse weather conditions for noise propagation persist for about 10 per cent of the time within a given year for winds prevailing towards Myara North receivers (which are predominantly to the West of the proposed mine operations) and only about 1 per cent of the time for winds prevailing towards Holyoake receivers (which are predominantly to the south and south-west of the proposed mine operations).
- The predicted exceedances are based on the EPA default, worst case weather conditions and on a direct source to receiver propagation path. The results are artefact of the assessment methodology and therefore conservative. The received noise levels at the NSRs

[18] As per *Draft Guideline: Assessment of Environmental Noise Emissions, Department of Water and Environmental Regulation, May 2021*

for weather conditions that are less conducive for noise propagation is expected to be lower and can be alleviated through operational noise management practices.

- The dominant noise sources affecting the received levels at the NSRs are the operational mobile equipment within the mines and these are likely to have some element of tonality. As tonality is not always evident at the receiver and prediction of tonality at receivers from mine site mobile equipment is impractical, an assessment has been conducted to identify results that are within 5 dBs of the Assigned Level which then indicates a risk of exceedance if tonality is present.

- The inclusion of tonality indicates that the following NSRs may be subject to an exceedance of Assigned Levels if tonality is present:

    - NSR 11-15 (rural properties along Balmoral Road);
    - NSR 23 (Monadnocks campsite on the Bibbulmun Track);
    - NSR 25 (Wungong campsite on the Munda Biddi Trail);
    - H-NSRs 1-14 (rural properties at Inglehope);
    - H-NSR 36 (Etmilyn Trail Rail Siding); and
    - H-NSR 38 (Chadora campsite on the Bibbulmun Track).

- Comparing the highest predicted noise levels against the monitored ambient noise levels, the received noise levels at Myara North's NSR 14 (rural property on Balmoral Road), NSR 23 (Monadnocks campsite on the Bibbulmun Track), NSR 24 (Mt Cooke campsite on Bibbulmun Track) and NSR 25 (Wungong campsite on the Munda Biddi Trail) is expected to be audible. Audibility is expected to be limited to adverse meteorological conditions and certain mine operations.

- Similarly, comparing the highest predicted noise levels against monitored ambient noise levels at Holyoake mine, operational mining noise is expected to be audible at H-NSR 4, 10, 13, 36 - 38 (comprising rural properties at Inglehope, Etmilyn Trail Rail Siding, Inglehope Shelter and Chadora campsite).

- Measured blast noise data from Alcoa's existing Myara region operations, indicate a 1.2 km radius will be required to attenuate peak blast noise levels to be below 120 dB(L). Based on this radius, standard blasting practices at a number of indicative Myara North and Holyoake mining pits or blocks may potentially cause an exceedance of the 120 dB(L) maximum limit as prescribed in Section 11 of the Regulations for residential receivers (including all recreational campsites). These mine blocks are shown in Section 6.2. Alternative caprock breaking methods (i.e. blue metal stemming and mechanical fracturing) will be considered for these areas which, along with current blast noise management practices, are expected to be effective in managing blast noise impacts to levels below the regulatory limits;

- Calculated distances for ground borne vibration levels from 9 kg and 7 kg maximum instantaneous charges are 212 m and 188 m respectively. Ground borne vibration is not expected to be significant at any NSRs (including all recreational campsites) for the Myara North and Holyoake mine regions.

APPENDIX A BACKGROUND NOISE LEVELS

A.1 Instrumentation

Table A-1 Instrumentation Used for the Noise Logging

Mining Area	Relevant NSRs	Noise Logger ID	Sound Level Meter (Make/Model)	Serial Number
Myara North	NSR 1	RASL 16.1	Bruel & Kjaer 2270	2664185
	NSR 3	RASL 14.1	Bruel & Kjaer 2250	3004058
	NSR 14	RASL 13.1	Bruel & Kjaer 2270	2679316
	NSR 18	RASL 14.2	Bruel & Kjaer 2250	3004058
	NSR 20	RASL12.1	Bruel & Kjaer 2270	2746573
	NSR 21	RASL10	Bruel & Kjaer 2250	3024400
	NSR 22	RASL 14.3	Bruel & Kjaer 2250	3004058
	NSR 24	RASL 12.2	Bruel & Kjaer 2270	2746573
Holyoake	NSR 4	RASL 15	Bruel & Kjaer 2270	3000267
	NSR 10	RASL 16.5	Bruel & Kjaer 2270	2664185
	NSR 13	RASL 13.4	Bruel & Kjaer 2270	2679316
	NSR 16	RASL 16.3	Bruel & Kjaer 2270	2664185
	NSR 17-24	RASL 16.4	Bruel & Kjaer 2270	2664185
	NSR 25-35	RASL 13.3	Bruel & Kjaer 2270	2679316
	NSR 36	RASL 12.3	Bruel & Kjaer 2270	2746573
	NSR 37	RASL 13.2	Bruel & Kjaer 2270	2679316

A.2 Myara North Background Noise Levels

Day, evening and night periods are defined as per table below:

Periods	Time of Day
Day	0700 – 1900 hours, Monday to Saturday 0900 – 1900 hours, Sunday and public holidays
Evening	1900 to 2200 hours, all days
Night	2000 – 0700, Monday to Saturday 2200 – 0900, Sunday and public holidays

"-" denotes measurement statistic N/A

A.1.1 NSR 1

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 04 Jul 2020	N/A	22.8	23.6	N/A	33.3	36.3	-	14.8	17.9	-	32.3	31.6	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative. Daytime: Period incomplete and not assessed due to deployment time. Evening: Lots of dogs barking. Some traffic and community noise can also be heard Nighttime: Dogs barking and traffic main sources of elevated levels. Birds and frogs ramp up in the morning
Sun, 05 Jul 2020	26.2	23.0	24.2	45.4	32.7	38.4	21.8	17.3	18.2	41.7	30.4	30.9	Daytime: Lots of extraneous noise. Birds most of the morning. Community noise in the afternoon. Evening: bit of rain and thunder early in evening. Dogs barking. Nighttime: raining on and off during the night. Some dogs barking.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 06 Jul 2020	33.4	26.8	24.4	50.8	38.7	30.2	29.7	23.0	20.1	46.0	34.7	26.7	Daytime: wind and rain all day Evening: wind dominant Nighttime: dogs barking cause the spikes. Air traffic at times. Can hear water dripping close by also.
Tue, 07 Jul 2020	29.9	24.4	25.6	44.9	40.9	47.8	24.6	19.6	21.8	38.9	32.3	39.8	Daytime: Raining on and off. Birds and air traffic main extraneous noise sources. Evening: frog causing the spikes. Community noise can be heard. Traffic Nighttime: frog causing the spikes, traffic. Can hear water dripping at times
Wed, 08 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-	-	-	-	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 09 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-	-	-	-	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.
Fri, 10 Jul 2020	29.0	30.0	29.5	46.5	37.8	39.4	23.8	26.1	26.3	42.2	34.1	35.6	Daytime: wind dominant. Birds and traffic also audible Evening: wind dominant Nighttime: wind dominant
Sat, 11 Jul 2020	30.6	20.6	19.1	50.9	29.2	36.3	25.1	17.0	15.1	48.3	26.2	28.2	Daytime: wind is dominant. Lots of birds and vehicle noise. Evening: dog barking. Community noise. Air traffic. Traffic close by Nighttime: wind dominant
Sun, 12 Jul 2020	20.1	18.9	23.5	53.4	40.5	43.9	16.2	14.5	16.2	51.5	37.8	38.1	Daytime: lots of vehicle and community noise present Evening: wind dominant Nighttime: wind dominant

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 13 Jul 2020	28.5	30.1	37.9	47.1	45.1	52.2	21.6	23.9	34.2	38.8	39.3	46.9	Daytime: raining all day. Lots of birds Evening: wind dominant Nighttime: wind dominant
Tue, 14 Jul 2020	27.1	20.3	21.4	46.9	36.9	37.3	20.2	15.0	14.1	41.8	28.5	27.6	Daytime: wind is dominant. Lots of birds also. Evening: rain dominant Nighttime: rain dominant
Wed, 15 Jul 2020	28.3	25.7	19.9	45.0	35.5	35.1	20.0	18.2	15.1	38.1	27.1	30.9	Daytime: birds, air traffic, community noise all present. Starts to rain in afternoon Evening: rain dominant Nighttime: dogs and birds causing the spikes. Periods of rain.
Thu, 16 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-	-	-	-	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 17 Jul 2020	21.5	20.4	19.5	45.8	25.5	27.7	19.1	17.6	16.2	40.4	24.7	26.9	Daytime: raining in the morning. Vehicle noise and lots of birds throughout Evening: air traffic spike. Can hear some machinery running for extended periods. Nighttime: dog barking. Can hear some machinery running at times - might be a train
Sat, 18 Jul 2020	25.1	20.2	21.4	48.5	24.7	36.0	21.6	17.1	16.2	43.2	23.7	29.5	Daytime: birds and vehicles present Evening: dogs barking. Can hear machinery continuously running Nighttime: can hear train noise. Can hear machinery continuously running. Traffic passing by
Sun, 19 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-	-	-	-	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 20 Jul 2020	N/A	19.1	20.8	N/A	34.6	32.7	-	15.4	18.0	-	34.4	31.7	Daytime: No Data Evening: continuous activity present, might be a train passing by slowly. Nighttime: a lot of vehicle activity throughout the night
Tue, 21 Jul 2020	25.6	18.2	17.5	45.7	28.4	19.8	21.2	13.0	10.3	39.8	27.2	15.9	Daytime: community noise, air traffic, vehicles, birds, dog barking Evening: air and road traffic. Lots of birds. Nighttime: dog barking. Birds
Wed, 22 Jul 2020	27.4	23.3	37.5	46.1	38.0	47.0	20.9	19.5	34.6	40.5	34.8	43.1	Daytime: continuous machinery/vehicle activity throughout the day Evening: wind dominant Nighttime: wind dominant
Thu, 23 Jul 2020	29.2	28.2	21.9	47.1	37.3	38.7	23.6	27.9	18.1	42.0	37.2	38.3	Daytime: wind is dominant. Lots of birds Evening: a lot of continuous vehicle activity. Might be a train passing slowly Nighttime: vehicle activity going on all night?

A.1.2 NSR 3

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 25 Jul 2020	33.9	28.7	25.5	53.6	37.3	50.7	29.9	25.4	18.3	48.1	34.4	40.2	Daytime: windy. Vehicles noise and birds present Evening: windy. Vehicles passing by Nighttime: raining all night. Windy until 2am
Mon, 26 Jul 2020	26.5	24.4	25.0	56.0	28.9	31.7	19.5	16.8	17.1	53.0	22.5	27.3	Daytime: birds. Somebody working close by (grinding metal, listening to radio etc.). Air traffic Evening: the odd car passing and cat meowing. Nighttime: occasional car passing. Wind become audible towards end
Tue, 27 Jul 2020	39.4	36.5	27.7	54.1	54.8	38.9	31.6	26.8	19.3	49.3	46.9	29.2	Daytime: wind and rain all day Evening: raining all evening. Nighttime: raining all night. Not windy
Wed, 28 Jul 2020	25.1	22.0	22.3	50.1	25.6	29.6	17.6	14.0	13.7	39.4	18.5	21.6	Daytime: lots of birds, vehicles passing by. Can hear someone's radio playing Evening: occasional car passing and

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													frog croak Nighttime: occasional car passing
Thu, 29 Jul 2020	27.5	26.9	26.5	49.4	30.4	31.2	19.9	18.5	17.1	40.2	22.7	25.3	Daytime: lots of birds, vehicles passing by. Radio playing again Evening: occasional car passing by and bird squawk Nighttime: occasional car passing and rustling nearby
Fri, 30 Jul 2020	29.5	26.8	24.6	49.8	30.9	29.7	25.0	17.7	13.9	41.2	24.0	21.4	Daytime: lots of birds, pretty uneventful otherwise. 1 plane passing over Evening: occasional car passing Nighttime: the odd car passing, plane flying overhead and cat meowing
Sat, 31 Jul 2020	24.5	20.8	19.5	48.0	27.5	25.2	15.8	11.3	11.9	38.7	18.4	19.6	Daytime: lots of birds, a bit windy and some vehicles. Can hear the radio again Evening: the odd car passing Nighttime: occasional car passing and nearby rustling

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 01 Aug 2020	23.2	19.4	19.1	53.2	25.5	38.8	14.5	8.9	9.4	45.4	19.6	26.2	Daytime: plenty of birds and some cars. Pretty uneventful otherwise Evening: occasional car/plane passing Nighttime: occasional car passing/frog croak
Mon, 02 Aug 2020	25.3	22.7	29.1	55.5	50.3	44.3	18.7	15.6	20.5	52.3	42.8	35.7	Daytime: lots of birds and few vehicles passing. Starts to rain in afternoon. Evening: wind and rain Nighttime: raining all night
Tue, 03 Aug 2020	27.6	20.2	19.8	48.7	25.4	25.4	21.8	12.1	11.8	38.7	22.1	21.0	Daytime: lots of birds, vehicles passing by. Radio playing again Evening: odd car passing, frogs / insects Nighttime: odd car passing, frogs / insects. Bird noise from 6.30AM onwards
Wed, 04 Aug 2020	25.0	23.3	24.4	49.3	27.3	37.0	17.0	16.5	20.1	39.9	23.1	33.5	Daytime: lots of birds, vehicles passing by. Somebody working close by (grinding metal) from 3pm - 3.20pm Evening: Quiet. Some insect making

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													HF noise. Faint LF noise - sounds like vehicle revving (not dominant) Nighttime: wind and trees rustling. Insect and frog(?) noise
Thu, 05 Aug 2020	27.8	21.8	20.6	52.9	26.2	27.5	20.3	13.0	13.0	42.3	20.9	22.1	Daytime: Light wind, trees rustling, birds and cars passing. Power Tools from 4.50-5.10pm Evening: insects, frogs, occasional car passing Nighttime: Light wind, trees rustling, insects, frogs

A.1.3 NSR 14

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 05 Jul 2020	27.3	20.8	22.3	44.2	39.0	42.7	22.8	13.3	14.7	42.3	32.3	35.0	Daytime: lot of traffic/construction activity. Also windy Evening: raining for large part of evening. Some occasional traffic noise Nighttime: wind and rain for large periods of night. Otherwise some occasional bird noise
Mon, 06 Jul 2020	34.3	24.7	21.1	55.8	34.6	35.0	28.6	19.4	12.0	49.5	31.2	29.9	Daytime: strong winds all day Evening: windy for good portion of evening. Otherwise occasional bird noise Nighttime: raining on and off throughout night. Some frequent bird noise (rooster) and occasional traffic
Tue, 07 Jul 2020	27.6	24.2	25.4	43.7	33.0	49.1	22.5	13.4	16.8	36.9	26.4	39.8	Daytime: periods of wind and rain throughout the day. Lots of birds noise and traffic/construction noise Evening: light rains. Fair bit of bird/insect activity Nighttime: heavy rain until 12am which then eases for remainder of night

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 08 Jul 2020	24.5	23.1	24.0	38.9	27.9	35.8	15.8	10.4	11.7	31.0	23.9	30.7	Daytime: mainly bird noise with some traffic/construction intermittently Evening: occasional air traffic/dog barking Nighttime: occasional car/dog bark/frog croak
Thu, 09 Jul 2020	24.7	23.2	21.7	39.3	26.5	30.4	12.8	10.9	13.0	32.4	18.9	27.1	Daytime: lots of bird noise and some human activity close to monitor Evening: occasional vehicle/bird/frog Nighttime: occasional dog/frog/rooster noise
Fri, 10 Jul 2020	27.9	28.3	34.4	42.6	37.6	45.3	23.4	23.5	31.1	36.9	33.5	41.0	Daytime: windy all day with bird and traffic/construction noise Evening: windy all evening Nighttime: windy all night
Sat, 11 Jul 2020	29.1	30.0	33.6	47.6	38.8	46.6	24.9	26.6	30.4	43.7	35.1	41.2	Daytime: windy in morning but calm in afternoon with bird and traffic noise mostly Evening: windy all evening Nighttime: windy all night
Sun, 12 Jul 2020	28.6	22.7	24.2	49.7	46.2	47.5	24.7	17.3	17.2	45.9	41.5	40.4	Daytime: windy all day Evening: windy for second half of evening, occasional traffic/frogs in first half Nighttime: wind and rain all night

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 13 Jul 2020	33.0	35.2	39.8	48.7	52.5	57.2	27.3	28.7	35.6	40.4	45.3	51.1	Daytime: raining most of the day Evening: wind and rain all evening Nighttime: windy all night
Tue, 14 Jul 2020	27.2	26.5	25.9	42.0	46.9	36.7	22.2	19.2	17.7	37.1	37.3	29.8	Daytime: some periods of rain. Lots of birds otherwise Evening: rain all evening Nighttime: light rain most of the night
Wed, 15 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.
Thu, 16 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 17 Jul 2020	27.6	27.0	25.2	41.2	30.0	31.0	18.4	17.8	16.3	35.8	22.7	26.0	Daytime: wind and rain in the morning. Otherwise mostly bird and traffic noise in afternoon Evening: occasional air traffic/bird Nighttime: occasional air traffic/bird/rooster
Sat, 18 Jul 2020	27.7	26.8	26.2	41.6	29.5	34.9	20.9	15.8	16.8	35.9	19.3	30.0	Daytime: mostly bird and vehicle noise. Periods of light rain in afternoon Evening: occasional tree rustling/bird squawk Nighttime: occasional bird/rooster/tree rustling
Sun, 19 Jul 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.
Mon, 20 Jul 2020	N/A	25.9	25.1	N/A	30.8	37.6	N/A	16.5	16.7	N/A	24.1	33.4	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Daytime: Data deemed not representative Evening: occasional vehicle/bird noise Nighttime: windy from 2am onwards. Quiet before this with occasional traffic/birds
Tue, 21 Jul 2020	30.5	26.0	25.1	47.2	31.8	36.4	24.9	18.0	16.7	41.6	25.5	31.8	Daytime: windy in morning/early afternoon. Mostly bird noise for remainder of day Evening: occasional air traffic/bird noise Nighttime: occasional bird squawk. Windy in second half of night
Wed, 22 Jul 2020	30.8	26.0	34.6	46.9	42.8	50.2	25.7	20.2	32.0	41.4	38.2	43.6	Daytime: windy most of the day Evening: windy most of the evening Nighttime: wind and rain all night

A.1.4 NSR 18

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 28 Aug 2020	N/A	37.3	27.2	N/A	49.9	46.9	N/A	35.2	24.2	N/A	47.1	44.3	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative. Daytime: Period incomplete and not assessed due to deployment time. Evening: Traffic, wind and trees rustling Nighttime: Wind and trees rustling. Occasional traffic. Bird noise from 4AM
Sun, 29 Aug 2020	29.4	26.1	24.4	53.7	36.9	46.7	27.5	24.4	22.4	52.4	35.8	46.3	Daytime: Birds chirping in the morning. Traffic all day Evening: Traffic. Sound like a small generator nearby starts up at 2020 and continues to end of period. Strong 100 Hz tone (No revving can be heard - therefore likely not ME). Community noise around this point as well. What sounds like a chainsaw operates from 2050 to 2105. Nighttime: Community noise dies down around 2245. Quiet from 2245 to 2320 - insects and dogs barking. Machinery (not

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													sure what it is) turns on @ 12AM and stays on for rest of period
Mon, 30 Aug 2020	23.7	21.7	25.7	56.8	34.6	51.2	20.9	17.9	24.4	55.6	34.0	51.0	Daytime: Traffic, wind and trees rustling. Periods of localised activity - sounds like a small generator operating on property. Evening: Occasional traffic noise. Insects / Frogs / Birds audible during no traffic Nighttime: Localised industry noise. Sounds like a small generator or equipment operating intermittently. Machinery (not sure what it is) turns on @ 12:45 AM and stays on for rest of period
Tue, 31 Aug 2020	33.4	30.7	32.3	49.9	44.2	50.2	31.3	27.9	29.2	48.0	40.8	46.4	Daytime: Birds, traffic, wind and trees rustling Evening: Wind and trees rustling. Rain and higher winds towards end of period Nighttime: Wind and trees rustling. Rain on and off during period. Birds and traffic also present post 0430

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 01 Sep 2020	36.0	26.1	28.2	56.0	40.4	46.4	33.8	23.5	25.5	53.1	38.1	42.4	Daytime: Wind and trees rustling. Traffic. Evening: Wind and trees rustling. Traffic. Nighttime: Wind and trees rustling, occasional rain showers. Traffic and bird noise increases from 0400. Birds and insects audible during periods of low wind and no traffic.
Thu, 02 Sep 2020	32.0	22.6	23.7	53.9	34.7	38.2	30.2	16.9	17.5	51.1	33.2	36.4	Daytime: Wind and trees rustling. Traffic. Evening: Traffic. Insects and frogs audible when no traffic. Post 2115 localised activities begin - equipment operational Nighttime: Localised activities until 0200. Insects, frogs and occasional dogs barking audible when no traffic. Birds, traffic and localised activities pick up around 0400
Fri, 03 Sep 2020	33.2	23.9	24.1	55.8	40.5	35.4	31.4	17.1	16.2	54.5	39.9	32.7	Daytime: Traffic, birds chirping, localised mobile equipment / hand tools, wind Evening: Occasional traffic. Insects and frogs audible when no traffic. Nighttime: Traffic early and late in period. insects, frogs, birds audible when no traffic

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 04 Sep 2020	28.1	25.4	24.7	51.7	34.8	36.4	26.1	20.1	18.2	50.3	33.4	34.0	Daytime: Birds, traffic, localised activities Evening: Insect, birds, traffic and noise from localised activities (sounds like a small generator operating on property) and music Nighttime: Insects, birds. Traffic and noise from localised activities during periods of the night
Sun, 05 Sep 2020	31.9	27.9	31.5	55.5	40.1	44.6	29.6	24.7	28.3	54.2	37.7	41.4	Daytime: birds chirping, traffic, wind and trees rustling Evening: traffic, insects / frogs, dogs barking, wind and trees rustling Nighttime: traffic, wind and trees rustling. Birds audible post 5AM
Mon, 06 Sep 2020	43.1	40.5	29.8	59.2	54.2	44.6	39.5	35.7	25.0	56.6	49.5	39.9	Daytime: Rain and wind Evening: Rain and wind all period Nighttime: Rain, wind and rustling trees. Rain and wind die down at 0100 - insects and birds audible during this period as well as occasional traffic noise. Traffic and bird noise becomes dominant around 0400

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Tue, 07 Sep 2020	31.1	23.7	23.0	51.3	32.5	34.5	29.4	20.5	18.6	48.6	31.7	32.3	Daytime: Birds chirping. Traffic, wind and trees rustling Evening: Occasional traffic and noise from localised activities. Insects and frogs audible during periods of low traffic, with Occasional noise from other fauna (birds / dogs) Nighttime: Little traffic noise at start of period. Insects, frogs and occasional bird noise audible. Sounds like a small generator/motor that turns on / off a few times during period. Bird and traffic noise picks up from 0200 onwards
Wed, 08 Sep 2020	28.7	24.7	23.4	47.6	33.6	35.4	26.3	20.6	19.7	46.1	32.6	32.9	Daytime: Birds chirping, traffic, community noise Evening: Occasional traffic noise. Insects and other fauna (frogs and birds?). Localised activities during most of period - small engine running nearby for period Nighttime: Occasional traffic noise. Insects and other fauna (frogs). Localised activities from 2320, birds from 0300.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 09 Sep 2020	31.5	29.5	31.1	50.8	40.1	50.5	29.2	26.8	28.5	48.2	37.4	47.1	Daytime: Traffic and birds chirping. Wind and trees rustling from 1000 Evening: Occasional traffic noise. Wind and trees rustling Nighttime: Wind and rustling trees, Rain present all night. Traffic / birds post 0430 also audible post 0430
Fri, 10 Sep 2020	30.5	23.6	22.5	48.3	32.5	33.5	28.8	18.4	16.6	46.6	31.2	30.4	Daytime: Traffic, birds chirping, wind and trees rustling Evening: Occasional traffic. Insects and frogs. Community noise also present during periods. Nighttime: Insects and other fauna (frogs and owls - during periods). Localised industrial noise during periods of night. Birds and traffic dominant from 0400

A.1.5 NSR 20

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 06 Aug 2020	N/A	19.9	21.0	N/A	32.3	34.1	N/A	13.7	17.3	N/A	31.3	31.7	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative. Daytime: Period incomplete and not assessed due to deployment time. Evening: Unable to identify major noise source (wind, rustling) Nighttime: Unable to identify major noise source (wind, rustling, white noise?).
Sun, 07 Aug 2020	30.3	29.3	28.7	47.5	42.4	40.7	28.1	27.5	26.6	44.8	39.6	37.8	Daytime: Vehicles, birds, broadband noise (unknown source). Evening: Vehicles, birds, broadband noise (unknown source). Nighttime: Vehicles, birds, broadband noise (unknown source).

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 08 Aug 2020	37.0	34.7	N/A	49.9	43.7	N/A	34.9	32.6	N/A	47.9	40.4	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative. Daytime: Vehicles, birds, broadband noise (unknown source). Evening: Vehicles, birds, broadband noise (unknown source). Nighttime: Data deemed not representative
Tue, 09 Aug 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 10 Aug 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.
Thu, 11 Aug 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.
Fri, 12 Aug 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 13 Aug 2020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Overcast weather conditions caused disrupted power supply from the logger's solar power system. Consequently data capture was not continuous during the relevant day/evening/ night period and is therefore not deemed representative.
Sun, 14 Aug 2020	N/A	23.7	22.7	N/A	37.7	31.8	N/A	19.6	15.1	N/A	37.0	30.0	Daytime: No Data Evening: Reasonably quiet, Mobile Equipment revving is faintly audible during quiet periods Nighttime: Vehicles. Mobile Equipment revving is faintly audible during quiet periods
Mon, 15 Aug 2020	34.5	35.9	30.7	53.6	60.1	48.2	31.5	32.2	26.0	49.6	53.2	42.5	Daytime: Vehicles, birds. Evening: Lots of broadband noise (unknown source). Nighttime: Lots of broadband noise (unknown source).
Tue, 16 Aug 2020	32.7	32.4	27.0	50.3	49.2	46.3	29.3	29.8	20.6	46.4	45.7	38.7	Daytime: Lots of wind/rain. Evening: Lots of wind/rain. Nighttime: Lots of wind/rain.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 17 Aug 2020	34.3	25.4	24.3	49.3	40.7	41.9	31.9	20.7	18.4	46.7	37.9	35.8	Daytime: Vehicles, birds. Broadband noise (unknown source). Evening: Wind. Trees rustling. Traffic. Mobile Equipment revving is faintly audible during quiet periods Nighttime: Wind. Trees rustling. Rain during most of the evening with periods of no rain. Insects. Frogs. Mobile Equipment revving is faintly audible during quiet periods
Thu, 18 Aug 2020	29.1	22.8	23.0	47.9	30.0	56.0	26.4	18.1	19.2	44.8	28.7	55.6	Daytime: Vehicles, birds. Evening: Mobile Equipment revving is faintly audible during quiet periods Nighttime: Loud machinery, likely generator, started at 12AM and continues until 7AM
Fri, 19 Aug 2020	28.9	22.0	20.4	56.3	31.2	54.4	26.7	15.6	14.9	54.8	30.1	53.9	Daytime: Vehicles, birds. Evening: Mobile Equipment revving is faintly audible during quiet periods Nighttime: Mobile Equipment revving is faintly audible during quiet periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 20 Aug 2020	28.5	21.4	20.2	50.4	31.9	55.6	26.2	15.9	14.4	49.2	31.1	55.2	Daytime: Vehicles, birds. Mobile Equipment revving is faintly audible during quiet periods Evening: Mobile Equipment revving is faintly audible during quiet periods Nighttime: Reasonably quiet, Mobile Equipment revving is faintly audible during quiet periods
Sun, 21 Aug 2020	26.3	21.9	21.5	48.0	36.0	34.5	23.7	15.9	16.4	46.7	35.0	33.2	Daytime: Extraneous noise includes traffic, birds and localised machinery noise (sounds like a generator) Evening: Extraneous noise includes traffic, insects, frogs and localised machinery (sounds like a motor). Mobile equipment revving is faintly audible during quiet periods. Nighttime: Background noise includes occasional traffic noise, insects, frogs, birds. Mobile Equipment revving is faintly audible during quiet periods.
Mon, 22 Aug 2020	29.3	24.7	23.5	45.9	34.7	37.7	26.7	17.0	15.3	43.8	33.0	35.1	Daytime: Background noise includes localised machinery noise, traffic and

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													birds. Mobile Equipment revving is faintly audible during quiet periods Evening: Traffic noise, insects and frogs audible. Mobile Equipment revving is faintly audible during quiet periods Nighttime: Frog noise, insects, traffic and light rain for a small period. Mobile Equipment revving is faintly audible during quiet periods
Tue, 23 Aug 2020	26.2	23.2	22.1	47.0	31.7	54.1	20.8	16.1	13.9	45.1	30.4	53.6	Daytime: Vehicles, birds. Evening: Lots of extraneous noise. Nighttime: Little extraneous noise. Occasional vehicles and birds.
Wed, 24 Aug 2020	25.5	22.4	20.8	53.1	31.4	53.3	21.4	12.4	12.8	51.4	30.3	52.8	Daytime: Vehicles, birds. Evening: Mobile Equipment revving is very faintly audible during quiet periods Nighttime: Mobile Equipment revving is faintly audible during quiet periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 25 Aug 2020	27.0	21.8	20.1	44.5	33.8	54.1	24.2	15.9	14.5	42.9	33.1	53.6	Daytime: Birds, vehicles. Mobile Equipment revving is faintly audible during quiet periods Evening: Little extraneous noise. Occasional vehicles and birds. Nighttime: Mobile Equipment revving is very faintly audible during quiet periods
Fri, 26 Aug 2020	28.16	21.42	19.53	47.08	29.65	53.25	25.2	14.0	13.4	44.7	28.2	52.6	Daytime: Vehicles, birds. Mobile Equipment revving is faintly audible during quiet periods Evening: Mobile Equipment revving is very faintly audible during quiet periods Nighttime: Mobile Equipment revving is faintly audible during quiet periods

A.1.6 NSR 21

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 07 Aug 2020	N/A	39.8	36.9	N/A	48.1	47.1	-	37.6	34.6	-	45.1	44.3	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Daytime: Very windy. Vehicles passing. Birds. Evening: Very windy. Nighttime: Very windy.
Sun, 08 Aug 2020	40.6	42.0	46.1	52.1	48.8	58.2	38.7	39.8	43.5	49.2	45.9	55.1	Daytime: Very windy Evening: Very windy Nighttime: Very windy
Mon, 09 Aug 2020	34.3	30.6	30.3	55.7	47.9	50.5	31.7	28.2	26.2	51.1	39.6	42.1	Daytime: Very windy and raining throughout day Evening: Very windy and raining throughout day Nighttime: Very windy and raining throughout day
Tue, 10 Aug 2020	36.6	36.2	35.8	49.0	46.0	46.8	32.6	33.9	32.8	44.6	42.1	42.8	Daytime: Very windy Evening: Very windy Nighttime: Very windy

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 11 Aug 2020	31.3	19.6	17.8	45.6	30.1	24.0	27.1	15.6	12.5	39.4	24.2	20.8	Daytime: Birds vehicles. Mobile Equipment revving is faintly audible during quiet periods. Evening: Reasonably quiet. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods.
Thu, 12 Aug 2020	23.7	18.0	18.1	39.2	22.1	30.4	20.2	13.3	13.5	31.7	20.0	28.7	Daytime: Birds, vehicles. Mobile Equipment revving is faintly audible during quiet periods. Evening: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 13 Aug 2020	25.0	18.5	18.0	39.0	25.8	31.0	22.2	14.6	13.0	33.6	24.6	29.6	Daytime: Birds, vehicles. Mobile Equipment revving is faintly audible during quiet periods. Evening: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods.
Sat, 14 Aug 2020	27.2	23.3	20.0	45.2	36.0	34.1	25.2	21.8	16.3	34.9	35.6	31.8	Daytime: Birds, vehicles. Mobile Equipment revving is faintly audible during quiet periods. Evening: Localised traffic. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Localised traffic. Mobile Equipment revving is faintly audible during quiet periods.
Sun, 15 Aug 2020	35.2	40.2	30.7	51.2	60.1	47.1	33.1	36.4	26.1	44.7	53.9	41.3	Daytime: Windy. Birds chirping Evening: Windy. Birds chirping Nighttime: Windy. Mobile Equipment

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													revving is faintly audible during quiet periods.
Mon, 16 Aug 2020	33.6	34.3	25.3	47.6	49.7	45.3	29.0	32.3	21.0	43.6	45.9	37.7	Daytime: Windy, raining. Vehicles. Evening: Windy, raining. Vehicles. Nighttime: Windy, raining. Vehicles.
Tue, 17 Aug 2020	34.2	25.7	23.4	50.1	41.2	39.5	31.2	23.5	20.5	46.5	38.1	35.0	Daytime: Windy, vehicles, birds. Evening: Windy, vehicles, birds. Nighttime: Windy, traffic, birds. Mobile Equipment revving is faintly audible during quiet periods.
Wed, 18 Aug 2020	25.9	19.2	19.6	40.3	23.8	31.8	22.8	16.0	16.7	36.3	22.6	30.3	Daytime: Windy, trees rustling, traffic, birds and dogs barking. Mobile Equipment revving is faintly audible during quiet periods. Evening: Occasional traffic noise and dogs barking. Faint noise from frogs and birds. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Occasional traffic noise and dogs barking. Faint noise from frogs and birds. Traffic and bird noise becomes dominant from 4AM onwards. Mobile Equipment

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													revving is faintly audible during quiet periods.
Thu, 19 Aug 2020	23.4	17.9	18.2	37.8	24.6	33.2	20.3	12.9	13.7	32.0	23.6	32.0	Daytime: Traffic, aircraft overhead, birds, wind and trees rustling. Mobile Equipment revving is faintly audible during quiet periods. Evening: Occasional noise from traffic and birds. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Faint background noise from frogs and birds (roosters and owls). Traffic and bird noise becomes dominant from 4AM onwards. Mobile Equipment revving is faintly audible during quiet periods.
Fri, 20 Aug 2020	24.7	18.2	17.6	38.2	25.5	37.0	21.5	13.4	11.8	34.3	24.4	36.4	Daytime: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods. Evening: Traffic. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Traffic. Mobile Equipment revving is faintly audible during quiet periods.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 21 Aug 2020	26.1	21.8	24.3	38.9	31.6	30.9	24.0	19.3	21.5	36.8	31.1	28.7	Daytime: Traffic, birds. Mobile Equipment revving is faintly audible during quiet periods. Evening: Wind Nighttime: Wind
Sun, 22 Aug 2020	28.0	19.8	18.7	38.5	26.8	32.0	25.5	16.3	14.7	35.4	24.9	27.0	Daytime: Windy. Birds, traffic. Mobile equipment faintly audible on occasions during quiet periods Evening: Windy. Birds, traffic. Mobile equipment faintly audible on occasions during quiet periods Nighttime: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods.
Mon, 23 Aug 2020	20.1	17.9	17.6	40.9	24.6	34.9	17.2	13.0	11.7	35.7	23.4	34.3	Daytime: Wind. Birds, traffic. Mobile Equipment revving is faintly audible during quiet periods. Evening: Traffic. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Little extraneous noise. Mobile Equipment revving is faintly audible during quiet periods.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Tue, 24 Aug 2020	21.5	18.1	18.4	35.9	25.5	35.6	17.7	12.6	13.0	31.8	24.6	34.9	Daytime: Birds, vehicles. Mobile Equipment revving is faintly audible during quiet periods. Evening: Reasonably quiet, with few extraneous sources. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Reasonably quiet, with few extraneous sources. Mobile Equipment revving is faintly audible during quiet periods.
Wed, 25 Aug 2020	23.8	18.1	17.7	39.2	25.5	32.0	21.1	13.2	12.2	32.8	24.6	30.8	Daytime: Mobile equipment revving is audible during quiet periods in the morning Evening: Traffic. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Traffic. Mobile Equipment revving is faintly audible during quiet periods.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 26 Aug 2020	24.1	18.4	18.7	37.6	23.1	33.1	20.2	13.8	14.1	31.8	21.3	31.8	Daytime: Planes overheard, community noise (people talking), wind, birds, traffic, trees rustling Evening: Dogs barking, occasional traffic and bird noise audible. Mobile Equipment revving is faintly audible during quiet periods. Nighttime: Aircraft overhead, birds and occasional traffic noise. Traffic and birds dominant from ~4:30AM. Mobile Equipment revving is faintly audible during quiet periods.
Fri, 27 Aug 2020	26.1	23.58	26.57	38.84	29.03	38.76	23.5	20.8	23.6	34.5	27.0	36.5	Daytime: Wind. Traffic, birds. Mobile Equipment revving is faintly audible during quiet periods. Evening: Wind Nighttime: Wind

A.1.7 NSR 22

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 14 Aug 2020	N/A	23.0	20.0	N/A	33.8	32.5	N/A	21.6	17.1	N/A	33.5	30.2	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Daytime: Birds, vehicles. Faint low frequency rumble is audible. Evening: Birds, vehicles. Faint low frequency rumble is audible. during quiet periods. Nighttime: Vehicles. Faint low frequency rumble is audible. during quiet periods.
Sun, 15 Aug 2020	33.9	37.7	29.9	48.9	57.3	45.1	31.3	34.4	26.6	44.3	52.9	41.0	Daytime: Windy. Birds, vehicles. Evening: Windy/raining. Nighttime: Windy/raining.
Mon, 16 Aug 2020	32.9	34.3	24.9	47.3	48.5	43.7	28.6	32.7	22.5	44.1	45.9	38.2	Daytime: Windy/raining. Evening: Windy/raining. Nighttime: Windy/raining.
Tue, 17 Aug 2020	34.6	28.1	24.6	49.6	43.1	39.2	31.9	26.3	22.5	46.9	41.0	36.3	Daytime: Windy/raining. Evening: Windy/raining. Nighttime: Windy/raining.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 18 Aug 2020	27.8	21.2	20.1	43.1	24.6	27.6	24.5	18.8	17.3	38.6	23.4	23.9	Daytime: Windy/raining. Evening: Little extraneous noise. Faint low frequency rumble is audible. Nighttime: Little extraneous noise. Faint low frequency rumble is audible.
Thu, 19 Aug 2020	24.9	18.6	18.6	39.5	23.2	30.4	21.1	14.6	15.1	31.4	22.0	27.0	Daytime: Birds, vehicles. Faint low frequency rumble is audible. Evening: Reasonably quiet with little extraneous noise, Faint low frequency rumble is audible. Nighttime: Reasonably quiet with little extraneous noise, Faint low frequency rumble is audible.
Fri, 20 Aug 2020	25.3	19.7	18.1	41.2	22.4	30.4	21.1	16.5	13.9	34.8	20.9	28.6	Daytime: Birds, vehicles. Low frequency rumble is audible during quiet periods Evening: Reasonably quiet with little extraneous noise, Faint low frequency rumble is audible. Nighttime: Reasonably quiet with little extraneous noise, Faint low frequency rumble is audible.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 21 Aug 2020	23.8	19.7	20.3	42.4	25.9	30.1	20.0	17.1	17.8	36.6	25.2	27.3	Daytime: Birds, traffic and aircraft overhead. Low frequency rumble is audible during quiet periods in late afternoon Evening: Minimal extraneous noise, however traffic and dogs barking are audible during the period. Faint low frequency rumble is audible. Nighttime: Minimal extraneous noise, however traffic, birds and dogs barking are audible during the period. Traffic and birds dominant from ~5AM. Faint low frequency rumble is audible.
Sun, 22 Aug 2020	29.0	21.1	19.6	40.7	31.3	32.9	26.3	19.0	16.6	36.4	29.6	27.5	Daytime: Birds, vehicles. Low frequency rumble is audible during quiet periods in late afternoon Evening: Lots of extraneous noise - birds and vehicles Nighttime: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 23 Aug 2020	21.2	19.6	18.5	39.5	23.2	29.2	19.0	16.8	14.7	34.9	22.0	26.9	Daytime: Windy. Birds, vehicles. Low frequency rumble is audible during quiet periods in late afternoon Evening: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods Nighttime: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods
Tue, 24 Aug 2020	22.2	17.7	18.0	38.5	20.8	30.6	18.1	12.8	13.3	29.9	18.4	28.5	Daytime: Birds, vehicles. Low frequency rumble is audible during quiet periods in late afternoon Evening: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods Nighttime: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 25 Aug 2020	23.9	19.0	18.4	37.9	22.3	27.9	20.4	15.6	14.8	30.3	20.6	24.0	Daytime: Birds, traffic, aircraft overhead and wind. Low frequency rumble is audible during quieter periods Evening: Minimal extraneous noise, however frogs, dogs barking, birds are audible during the period. Low frequency rumble is audible during quieter periods Nighttime: Minimal extraneous noise, however birds, traffic, aircraft overhead and wind are audible during the period. Low frequency rumble is audible during quieter periods
Thu, 26 Aug 2020	23.9	18.3	18.6	37.5	21.9	28.7	19.8	13.9	14.7	30.8	19.6	25.9	Daytime: Birds, vehicles. Low frequency rumble is audible during quiet periods in late afternoon Evening: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods Nighttime: Reasonably quiet, little extraneous noise. Low frequency rumble is audible during quieter periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 27 Aug 2020	25.0	20.9	22.7	39.1	24.5	33.3	21.9	18.5	20.3	31.3	22.7	31.3	Daytime: Extraneous noise includes birds, traffic, aircraft overhead and wind. Low frequency rumble is audible during quiet periods in late afternoon Evening: Minimal extraneous noise, however traffic, dogs barking and aircraft overhead are audible during the period. Faint insect and frog noise. Low frequency rumble is audible during quieter periods Nighttime: Minimal extraneous noise, however traffic, dogs barking and aircraft overhead are audible during the period. Faint insect and frog noise. Wind dominant from ~4AM onwards. Low frequency rumble is audible during quieter periods

A.1.8 NSR 24

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 25 Jul 2020	33.7	29.3	23.1	46.7	39.6	42.4	31.9	27.4	17.4	44.1	36.9	36.0	Daytime: windy all day Evening: windy all evening Nighttime: wind and rain most of the night
Mon, 26 Jul 2020	20.7	19.0	19.1	35.1	25.5	32.2	17.6	15.3	15.8	31.0	22.5	31.0	Daytime: windy in morning. Calm in afternoon with some bird noise Evening: calm with some frequent rustling close to monitor Nighttime: calm with some frequent rustling close to monitor
Tue, 27 Jul 2020	35.5	34.3	22.9	52.5	51.4	38.5	33.5	29.8	15.6	48.8	41.9	36.8	Daytime: windy all day Evening: wind and rain all evening Nighttime: light rain all night with periods of increased wind/rain
Wed, 28 Jul 2020	29.1	20.1	17.9	40.4	38.5	31.3	28.0	17.9	13.6	39.7	38.2	30.3	Daytime: some periods of wind during day, otherwise lots of traffic noise Evening: frequent traffic noise Nighttime: frequent traffic noise
Thu, 29 Jul 2020	22.3	19.8	17.5	34.4	35.4	32.4	19.9	16.5	11.1	33.4	35.1	31.7	Daytime: frequent bird and traffic noise Evening: frequent air and road traffic Nighttime: frequent traffic noise

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 30 Jul 2020	27.4	25.0	17.3	38.7	40.1	37.9	26.2	24.2	10.9	37.7	39.9	37.4	Daytime: windy in the early afternoon. Otherwise frequent bird and traffic noise Evening: frequent traffic noise Nighttime: regular traffic noise
Sat, 31 Jul 2020	30.1	24.4	19.1	39.7	38.7	32.8	28.9	23.5	15.7	39.0	38.3	30.6	Daytime: scattered light wind and rain. Otherwise constant traffic and bird noise Evening: frequent traffic noise Nighttime: regular traffic noise
Sun, 01 Aug 2020	21.7	17.6	16.3	33.4	32.3	33.1	19.2	11.8	6.8	31.8	31.9	31.8	Daytime: most bird noise with some traffic Evening: frequent traffic noise Nighttime: regular traffic noise but less frequently than during the week
Mon, 02 Aug 2020	24.4	25.4	21.9	37.3	45.0	41.8	22.4	21.5	17.3	36.0	37.1	36.7	Daytime: periods of wind and rain in afternoon. Occasional traffic noise Evening: raining all evening Nighttime: raining all night with periods of high wind
Tue, 03 Aug 2020	19.9	18.8	18.0	34.2	32.4	37.0	16.4	14.3	13.1	32.5	32.0	36.5	Daytime: mostly vehicles and birds with some air traffic. Windy during mid-afternoon

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Evening: regular traffic noise Nighttime: regular traffic noise
Wed, 04 Aug 2020	30.7	38.6	34.0	44.6	47.0	45.2	29.3	36.4	32.2	42.0	43.9	42.4	Audio data not available on this day due to file save issue on device.
Thu, 05 Aug 2020	30.3	28.5	30.6	44.5	41.5	43.1	28.7	26.5	28.6	41.9	39.4	39.8	Daytime: windy most of the day Evening: windy most of the evening Nighttime: windy most of the night

A.3 Holyoake Background Noise Levels

Day, evening and night periods are defined as per table below:

Periods	Time of Day
Day	0700 – 1900 hours, Monday to Saturday 0900 – 1900 hours, Sunday and public holidays
Evening	1900 to 2200 hours, all days
Night	2000 – 0700, Monday to Saturday 2200 – 0900, Sunday and public holidays

"-" denotes measurement statistic N/A

A.1.9 NSR 4

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 25 Jul 2020	35.3	31.6	24.3	56.1	42.5	45.7	33.2	29.0	18.1	54.6	40.4	37.7	Daytime: windy. Lots of vehicles and some birds Evening: windy. Fair bit of vehicle and community noise Nighttime: rain until 2am then drizzle. Occasional car passing and bird screeching
Mon, 26 Jul 2020	27.1	25.9	25.8	57.3	32.9	33.3	22.1	18.8	20.3	56.1	30.7	31.3	Daytime: lots of vehicle noise. Some birds Evening: occasional car passing. Some music playing after 9pm Nighttime: party stops at 1am. Occasional car passing and geese honking

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Tue, 27 Jul 2020	36.2	32.3	25.5	55.5	49.8	34.6	32.7	25.3	18.1	52.2	42.5	31.2	Daytime: wind and rain all day Evening: raining all evening Nighttime: drizzling. Occasional car/plane/bird screech/period of increased rain
Wed, 28 Jul 2020	29.0	23.4	22.8	47.5	31.5	30.9	26.8	16.9	16.2	45.3	29.8	28.5	Daytime: fair bit of vehicle/machine activity. Some birds Evening: occasional car, can hear music playing most of the evening Nighttime: community noise until 1. occasional car passing and bird
Thu, 29 Jul 2020	26.9	23.2	21.8	46.6	31.6	33.1	24.6	18.8	17.1	44.7	30.7	31.8	Daytime: lots of vehicles, some birds Evening: occasional car/plane/geese. Can also hear gunfire periodically Nighttime: occasional car/plane/geese. Can also hear gunfire periodically
Fri, 30 Jul 2020	29.3	23.4	21.5	48.5	30.2	31.7	27.7	20.1	16.5	46.5	28.9	29.7	Daytime: lots of cars/planes. Some birds Evening: occasional car. Music playing 9:30 onwards Nighttime: occasional car, dog barking

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 31 Jul 2020	25.9	21.5	20.4	49.8	37.9	31.5	23.4	15.8	13.7	48.0	37.1	29.4	Daytime: a bit windy, some rain. Lots of traffic and some birds Evening: occasional car/plane. Music playing from 9:30 Nighttime: occasional car/bird screech
Sun, 01 Aug 2020	26.1	20.5	19.1	54.0	36.1	35.7	23.2	14.3	13.4	52.6	34.7	32.9	Daytime: lots of vehicle activity, some birds Evening: occasional car/plane and some bird activity Nighttime: occasional car/plane/bird
Mon, 02 Aug 2020	25.9	22.9	23.7	56.5	45.5	40.6	22.0	17.8	18.6	55.4	41.2	36.8	Daytime: lots of traffic, some birds Evening: a machine fires up and keeps running. Starts to rain also Nighttime: raining all night
Tue, 03 Aug 2020	28.1	19.7	19.6	46.4	33.9	33.8	25.9	13.0	13.2	44.2	32.9	32.5	Daytime: windy. Lots of vehicles and birds present Evening: occasional cars passing and bird screeching Nighttime: community activity until midnight. Occasional car passing and bird screeching after 12am

A.1.10 NSR 10

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 26 Jul 2020	20.3	21.6	18.7	31.1	24.3	25.3	12.1	11.4	9.6	24.2	14.5	21.4	Daytime: pretty quiet. Only can hear birds and occasional plane Evening: a bit of rain but otherwise quiet Nighttime: the occasional frog/rustling nearby. Rooster in the morning
Tue, 27 Jul 2020	31.0	25.3	18.5	53.3	51.1	29.6	27.0	19.5	8.8	48.8	39.7	28.0	Daytime: wind and rain all day Evening: wind and rain most of evening Nighttime: occasional vehicle, nuts falling from tree, rooster in the morning
Wed, 28 Jul 2020	23.1	21.1	18.2	36.8	24.5	26.1	16.3	8.8	9.3	31.6	20.1	23.8	Daytime: windy most of the day Evening: occasional vehicle/frog/bird squawk Nighttime: occasional vehicle. Some owls hooting and the rooster again
Thu, 29 Jul 2020	19.0	19.8	18.0	30.8	24.7	23.9	11.8	11.4	11.0	25.7	21.2	22.0	Daytime: mostly bird song, and some traffic Evening: occasional vehicle/bird Nighttime: occasional vehicle/bird/dog barking. And the rooster

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 30 Jul 2020	20.8	18.3	17.5	34.7	23.4	30.1	15.4	10.8	8.5	28.6	21.7	25.5	Daytime: somewhat windy during the day. Otherwise birds and traffic Evening: occasional vehicle/bird Nighttime: starts to rain at 2:30. otherwise quiet with occasional vehicle/frog
Sat, 31 Jul 2020	20.7	17.5	17.1	33.8	23.4	23.1	14.1	8.4	8.7	27.4	21.8	20.8	Daytime: mainly birds and traffic. Bit windy at times Evening: occasional traffic and owl hoot Nighttime: occasional vehicle/frog croak. And rooster
Sun, 01 Aug 2020	19.2	17.0	16.6	31.4	22.7	27.1	10.7	7.0	6.6	24.2	21.2	24.2	Daytime: mainly birds and bit of traffic noise Evening: few vehicles passing by + occasional bird Nighttime: slightly more frequent traffic + bird noise. Rooster
Mon, 02 Aug 2020	19.7	19.0	21.1	36.8	45.6	47.2	12.9	10.5	12.5	30.3	33.2	34.9	Daytime: wind and rain most of the day Evening: rain all evening Nighttime: raining all night but only drizzle for most of night. Some periods of increased rain.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Tue, 03 Aug 2020	18.7	18.0	17.7	33.0	28.4	25.8	10.0	11.3	9.7	26.5	22.0	24.1	Daytime: mainly birds and traffic. Wind picks up in the evening Evening: rain for large chunk of evening. Quiet otherwise Nighttime: occasional vehicle/falling nuts from tree. Rooster in morning
Wed, 04 Aug 2020	20.1	22.7	23.6	33.6	32.6	36.2	14.9	19.1	20.0	27.2	27.3	30.5	Daytime: birds and traffic. A bit windy at times Evening: wind most of evening Nighttime: wind most of night
Thu, 05 Aug 2020	23.7	18.0	17.5	41.4	21.2	24.4	19.3	10.0	11.2	35.9	17.8	22.8	Daytime: windy most of the day Evening: occasional vehicle Nighttime: occasional vehicle/bird. + rooster

A.1.11 NSR 13

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 26 Jul 2020	19.6	19.3	18.8	34.2	23.1	24.9	13.4	13.3	11.8	26.8	17.3	19.6	Daytime: Birds chirping, wind, trees rustling, rain later in period Evening: Wind, trees rustling, insects Nighttime: Owl, fauna moving near monitor, wind, trees rustling. During times of low background noise occasional faint Low Frequency noise is audible - sounds like heavy vehicle revving (not dominant)
Mon, 27 Jul 2020	34.2	26.2	19.6	54.3	51.9	27.4	28.2	18.1	10.6	49.5	41.2	21.3	Daytime: Heavy wind, trees rustling, rain Evening: Heavy wind, trees rustling, rain Nighttime: Rain, wind, trees rustling, traffic
Tue, 28 Jul 2020	19.0	18.1	17.8	34.9	18.9	19.0	12.2	9.3	8.6	28.0	12.7	13.5	Daytime: Light rain, traffic, birds chirping, localised hand tools being used, wind and trees rustling Evening: Very little background noise. Occasional Bird noise Nighttime: Very little background noise. Occasional Bird noise

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 29 Jul 2020	19.2	18.2	17.9	30.8	19.7	19.5	12.1	10.8	9.9	19.7	14.8	14.8	Daytime: Birds chirping, wind, trees rustling, traffic Evening: Very little background noise. Occasional localised fauna noise. During times of low background noise occasional faint Low Frequency noise is audible - sounds like heavy vehicle revving (not dominant) Nighttime: Very little background noise. Occasional localised fauna noise. During times of low background noise occasional faint Low Frequency noise is audible - sounds like heavy vehicle revving (not dominant)
Thu, 30 Jul 2020	19.2	18.1	17.8	33.5	20.4	25.9	13.2	10.3	8.5	26.3	14.7	19.8	Daytime: Birds chirping, wind, trees rustling, insects, traffic Evening: Fauna activity near monitor, occasional traffic Nighttime: occasional traffic, fauna activity near monitor, rain later in period

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 31 Jul 2020	19.3	17.8	17.7	31.8	21.0	20.9	12.2	8.2	8.3	24.0	18.4	17.4	Daytime: light wind, trees rustling, rain, birds chirping, insects, traffic Evening: Very little background noise. Occasional Bird and traffic noise. During times of low background noise occasional faint Low Frequency rumbling noise is audible Nighttime: Very little background noise. Occasional localised fauna noise. During times of low background noise occasional faint Low Frequency noise is audible - sounds like heavy vehicle revving (not dominant)

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 01 Aug 2020	18.5	17.7	17.6	34.9	20.0	22.2	8.7	7.3	6.8	25.0	16.3	15.5	Daytime: Birds chirping, wind, trees rustling, traffic Evening: Very little background noise. Occasional localised fauna noise and traffic noise. During times of low background noise occasional faint Low Frequency noise is audible - sounds like rumbling and heavy vehicle revving (not dominant) Nighttime: Very little background noise. Occasional localised fauna noise and traffic noise. During times of low background noise occasional faint Low Frequency noise is audible - sounds like rumbling and heavy vehicle revving (not dominant)
Sun, 02 Aug 2020	19.7	19.1	24.7	37.0	45.9	49.2	11.6	10.5	14.7	28.5	35.1	38.0	Daytime: Birds chirping, wind, trees rustling, rain later in period Evening: Light to medium rain for evening period Nighttime: Heavy rain for most of night

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 03 Aug 2020	20.3	19.4	18.6	36.7	29.0	22.9	11.6	14.9	12.4	25.8	24.2	20.0	Daytime: rain, insects, trees rustling, light wind. Low frequency rumble audible post 6PM when rain stops Evening: Rain. Low frequency rumble audible when rain stops Nighttime: Very little background noise. Occasional; periods of rain, wind and trees rustling. Occasional faint Low Frequency noise is audible - sounds like heavy vehicle revving (not dominant). Traffic audible post 5AM
Tue, 04 Aug 2020	20.1	21.7	22.5	33.2	27.7	31.6	13.5	18.3	18.8	24.1	23.9	28.3	Daytime: birds, light wind, trees rustling, periods of light rain, Evening: Light rain, light wind, trees rustling Nighttime: Light wind, trees rustling
Wed, 05 Aug 2020	21.2	18.4	18.9	40.2	20.1	21.8	15.6	10.9	13.2	33.5	16.0	19.3	Daytime: wind, trees rustling. Post 5PM - birds Evening: Very little background noise. occasional traffic noise Nighttime: Very little background noise. occasional traffic noise

A.1.12 NSR 16

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 28 Aug 2020	N/A	32.3	22.1	N/A	53.3	43.8	N/A	29.9	16.2	N/A	50.5	40.5	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Daytime: Periods incomplete and not assessed due to deployment time. Evening: Rain. Wind and trees rustling Nighttime: Wind and rain. leaves rustling. Insects and frogs audible from 3AM. Consistent traffic post 5AM
Sun, 29 Aug 2020	25.2	21.5	19.5	48.4	36.6	37.6	20.2	13.4	13.7	47.1	35.6	34.6	Daytime: Birds chirping. Traffic Evening: Insects and frog noise. Traffic noise. Community noise - music from nearby residence Nighttime: Traffic noise (approx. 2-3 cars per hours). Continuous insect and frog noise. Traffic noise becomes consistent post 0430

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 30 Aug 2020	24.0	22.5	18.8	48.9	36.2	38.8	19.4	18.6	13.1	47.8	35.2	37.9	Daytime: Birds chirping. Traffic Evening: Insects and frog noise. Traffic noise. Nighttime: insect, frog and other fauna (cow / sheep). Traffic noise continuous and dominant from 0430 onwards
Tue, 31 Aug 2020	30.9	36.1	32.8	50.0	54.7	54.6	27.6	33.5	27.7	48.3	47.3	47.9	Daytime: Birds chirping. Traffic. Wind and noise from rustling trees Evening: Traffic. Wind, and rain (later in period) Nighttime: Rain. Traffic also audible post 0400
Wed, 01 Sep 2020	36.0	23.8	30.2	56.4	38.5	48.4	32.1	17.3	26.7	53.4	35.3	43.7	Daytime: Wind and rain. Traffic noise also audible on occasions Evening: Rain, wind and traffic dominant from 1900 to 1930 and 2030 onwards. Insect, frog noise and sheep audible in quiet periods Nighttime: wind and rain majority of night

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 02 Sep 2020	35.3	23.3	24.5	52.5	32.7	38.3	32.2	11.9	14.2	49.8	29.4	35.6	Daytime: Wind and rain for majority of day. Birds chirping and traffic noise in afternoon / early evening. Evening: Traffic noise (approx. 5 cars per hours). Insects and other fauna (ducks) Nighttime: Traffic noise (approx. 2-3 cars per hours). Insects and other fauna (ducks). Wind / Traffic from 0300 onwards
Fri, 03 Sep 2020	31.2	25.5	24.1	49.9	34.4	36.6	27.8	16.0	12.4	48.3	31.9	31.7	Daytime: Constant traffic noise throughout day. Wind and trees rustling. Birds chirping Evening: Light wind and trees rustling. Fairly constant traffic noise. Insects and other fauna (ducks and frogs). Occasional faint LF noise - sounds like vehicle revving (not dominant) Nighttime: A couple of periods of wind noise and rustling trees. Traffic dominant from 0400. Insects and other fauna (ducks and frogs).

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 04 Sep 2020	27.0	25.6	23.9	49.0	38.7	36.1	21.7	15.2	13.9	47.8	37.3	31.1	Daytime: Traffic. Bird Chatter. Occasional windy period Evening: Fairly frequent traffic. Insects and other fauna (ducks and frogs) Nighttime: Traffic noise (approx. 3-4 cars per hours). Insects and other fauna (ducks and frogs). Light rain from 2AM. Traffic / Birds chirping dominant from 0430
Sun, 05 Sep 2020	31.2	28.4	30.8	49.0	38.4	48.0	26.1	21.8	25.3	47.4	34.1	43.3	Daytime: Bird Chatter early in morning. Wind and traffic noise for rest of period Evening: Traffic noise, light rain, wind and rustling trees. Insects and other fauna (ducks and frogs) Nighttime: Rain, wind and rustling trees. Insects and other fauna (ducks and frogs) also audible - although not dominant. Traffic / birds chirping also audible post 0445

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 06 Sep 2020	41.8	32.1	28.6	57.8	54.9	49.0	38.1	25.4	23.0	51.8	46.2	41.7	Daytime: Rain and wind Evening: Rain all period. Becomes lighter around 9.30pm. Insects and other fauna (ducks and frogs) audible during periods of low rain noise Nighttime: Rain, wind and rustling trees. Rain and wind die down at 0315 - insects and other fauna (ducks and frogs) audible during this period as well as occasional traffic noise. Traffic picks up around 0400. Birds start chirping around 0600
Tue, 07 Sep 2020	32.7	23.8	23.2	51.6	38.1	42.0	29.0	14.2	13.0	49.3	37.0	38.6	Daytime: Birds chirping. Traffic, wind, rain and trees rustling Evening: Occasional traffic noise. Insects and other fauna (ducks and frogs) audible during periods of low traffic. Nighttime: Insects and other fauna (ducks and frogs) audible during periods of low traffic until 1. Light rain from 0100 onwards. Traffic and Birds chirping from 0400 onwards

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Wed, 08 Sep 2020	25.3	23.8	21.9	48.5	34.3	39.0	19.2	17.1	15.8	47.3	30.8	37.1	Daytime: Traffic and birds chirping Evening: Occasional traffic noise. Insects and other fauna (ducks and frogs) audible. Nighttime: Insects and other fauna (ducks and frogs) audible. Traffic from 0330 onwards, and birds chirping from 0600 onwards
Thu, 09 Sep 2020	30.2	27.6	30.2	49.6	38.9	52.0	26.5	22.7	26.4	48.0	34.1	48.1	Daytime: Traffic and birds chirping. Wind and trees rustling from 1200 Evening: Occasional traffic noise. Rain. Insects and other fauna (ducks and frogs) audible. Nighttime: Insects and other fauna (ducks and frogs). Wind and rustling trees. Traffic / birds post 0430
Fri, 10 Sep 2020	31.0	23.2	21.6	49.5	33.4	35.9	25.8	12.0	12.3	47.7	31.6	31.9	Daytime: Traffic, birds chirping, wind and trees rustling Evening: Occasional traffic noise. Insects and other fauna (ducks and frogs) audible. Nighttime: Insects and other fauna (ducks and frogs). Traffic becomes consistent and dominant post 0430

A.1.13 NSR 17-24

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 06 Aug 2020	N/A	25.6	20.4	N/A	42.8	46.1	N/A	12.9	14.4	N/A	40.5	44.2	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Daytime: Windy. Lots of vehicles passing. Occasional birds. Evening: Birds/insects dominant. Occasional vehicle. Faint low frequency rumble is audible in the early evening period Nighttime: Birds/insects dominant. Occasional vehicle. Faint low frequency rumble is audible
Sun, 07 Aug 2020	34.1	28.5	24.4	55.8	45.4	41.5	29.4	20.9	20.4	53.8	43.0	38.8	Daytime: Windy. Birds. Lots of vehicles. Evening: Windy. Birds. Lots of vehicles. Nighttime: Birds/insects dominant. Occasional vehicle. Faint low frequency rumble is audible

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 08 Aug 2020	37.3	39.1	42.1	57.3	50.3	57.7	33.2	34.3	37.8	54.9	46.8	53.9	Daytime: Wind and rain dominant Evening: Wind and rain dominant Nighttime: Wind and rain dominant
Tue, 09 Aug 2020	36.7	34.3	32.2	58.8	42.6	50.5	23.0	18.8	18.5	54.6	36.8	44.8	Daytime: Wind and rain dominant Evening: Wind and rain dominant Nighttime: Wind and rain dominant
Wed, 10 Aug 2020	34.2	41.4	36.6	55.0	51.2	53.2	27.8	30.3	26.4	51.7	43.9	48.0	Daytime: Windy/raining. Traffic Evening: Windy/raining. Vehicles passing. Birds/insects dominant during quiet periods. Nighttime: Windy/raining. Vehicles passing. Birds/insects dominant during quiet periods.
Thu, 11 Aug 2020	32.8	39.6	35.3	54.4	45.8	47.0	26.1	22.0	20.9	51.8	36.9	44.1	Daytime: Windy at times. Vehicles passing. Evening: Birds/insects dominant. Occasional vehicle. Nighttime: Birds/insects dominant. Occasional vehicle.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Fri, 12 Aug 2020	29.8	40.1	30.9	53.5	46.2	44.8	23.1	18.9	18.6	51.6	40.0	42.2	Daytime: Birds, insects, vehicles. Evening: Birds/insects dominant. Mobile Equipment revving is audible on occasions Nighttime: Birds/insects dominant. Faint low frequency rumble is audible and mobile equipment revving is audible on occasions
Sat, 13 Aug 2020	30.8	38.6	30.1	52.9	45.6	42.8	22.0	16.3	15.6	50.8	36.0	38.2	Daytime: Birds, fauna, vehicles. Evening: Birds, fauna, insects, vehicles. Nighttime: Birds, fauna, insects, vehicles.
Sun, 14 Aug 2020	29.8	37.3	32.0	54.1	50.0	43.0	22.0	16.8	15.1	52.0	47.3	36.2	Daytime: Birds, fauna, insects, vehicles. Evening: Birds/insects dominant. Occasional vehicle. Faint noise of mobile equipment revving is audible on occasions during quiet periods. Nighttime: Birds/insects dominant. Occasional vehicle. Faint noise of mobile equipment revving is audible on occasions during quiet periods.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 15 Aug 2020	33.4	42.9	37.8	55.6	56.3	51.3	27.9	31.0	27.2	53.1	49.5	44.8	Daytime: Windy. Vehicles and birds. Evening: Windy/raining. Birds/insects dominant. Occasional passing vehicle Nighttime: Windy/raining. Birds/insects dominant. Occasional passing vehicle
Tue, 16 Aug 2020	34.3	41.5	35.8	54.9	51.5	49.6	27.1	26.3	23.7	52.1	43.3	44.7	Daytime: Windy/raining. Birds/insects dominant. Vehicles also audible Evening: Windy/raining. Birds/insects dominant. Vehicles. Music being played. Nighttime: Windy/raining. Birds/insects dominant. Vehicles. Music being played.
Wed, 17 Aug 2020	36.6	37.5	33.1	52.0	45.5	45.6	30.5	23.7	22.2	49.3	40.7	43.1	Daytime: Windy. Vehicles and birds. Some work being done nearby, tools being used. Evening: Birds/insects dominant. Occasional vehicle. Community noise (music) audible. Faint mobile equipment revs occasionally audible during quiet periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Nighttime: Birds/insects dominant. Occasional vehicle. Faint mobile equipment revs occasionally audible during quiet periods
Thu, 18 Aug 2020	37.4	35.8	25.9	50.8	43.9	43.4	33.0	22.4	19.3	48.3	39.1	41.5	Daytime: Birds, insects, vehicles. Some wind. Evening: Birds/insects dominant. Music can be heard. Nighttime: Bird, insect and frog noise dominant. Community noise (music) also audible. Faint mobile equipment revs audible on occasion during quiet periods
Fri, 19 Aug 2020	34.2	30.6	23.7	50.0	42.0	42.7	29.2	20.1	17.3	48.1	39.4	41.0	Daytime: Birds, insects and vehicles dominant. Evening: Insects and frogs dominant. Mobile Equipment revs are audible on occasion, during quiet periods Nighttime: Insects and frogs dominant.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Mobile Equipment revs are audible on occasion, during quiet periods
Sat, 20 Aug 2020	36.3	28.7	21.8	56.0	43.0	41.2	31.8	21.6	14.7	54.2	40.3	39.4	Daytime: Lots of traffic noise. Birds. Evening: Birds, insects, traffic, music. Nighttime: Birds, insects, occasional vehicles.
Sun, 21 Aug 2020	34.3	29.5	23.0	53.3	46.5	40.7	29.9	17.8	16.6	51.1	44.0	37.8	Daytime: Lots of vehicle noise. Birds. Evening: Insects and frogs dominant. Faint low frequency rumble is audible. Mobile Equipment revs are audible on occasion, during quiet periods Nighttime: Insects and frogs dominant. Faint low frequency rumble is audible. Mobile Equipment revs are audible on occasion, during quiet periods

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Mon, 22 Aug 2020	30.9	33.4	28.5	51.1	43.2	43.4	25.5	17.1	16.7	49.3	38.4	38.9	Daytime: Lots of vehicle noise. Birds. Windy at times. Evening: Insects and frogs dominant. Faint low frequency rumble is audible. Mobile Equipment revs are audible on occasion, during quiet periods Nighttime: Insects and frogs dominant. Community noise (music) audible early in the period. Faint low frequency rumble is audible. Mobile Equipment revs are audible on occasion, during quiet periods
Tue, 23 Aug 2020	31.9	34.3	25.3	51.0	43.5	45.8	22.0	19.4	15.5	49.0	39.7	43.8	Daytime: Lots of vehicle noise. Birds. Windy at times. Evening: Birds, insects, occasional vehicles. Nighttime: Birds, insects, occasional vehicles.
Wed, 24 Aug 2020	32.9	33.4	25.6	53.7	44.7	45.2	28.4	19.3	16.0	51.5	41.7	43.4	Daytime: Lots of vehicle noise. Birds. Windy at times. Evening: Birds, insects, occasional vehicles.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Nighttime: Insects and frogs dominant. Mobile Equipment revs are audible on occasion, during quiet periods
Thu, 25 Aug 2020	32.6	28.6	22.5	48.6	42.4	42.6	28.0	16.7	15.2	46.9	39.4	40.4	Daytime: Lots of vehicle noise. Birds. Windy at times. Evening: Birds, insects, occasional vehicles. Nighttime: Birds, insects, occasional vehicles.
Fri, 26 Aug 2020	32.47	28.34	22.2	50.81	40.8	42.5	27.4	15.9	15.4	48.9	37.9	39.7	Daytime: Lots of vehicle noise. Birds. Windy at times. Evening: Birds, insects, occasional vehicles. Nighttime: Insect noise dominant. Low frequency rumble audible in the background
Sat, 27 Aug 2020	35.39	30.2	24.08	51.6	42.01	42.62	31.5	20.2	17.4	49.6	39.4	40.7	Daytime: Vehicles, birds. Evening: Insect noise dominant. Low frequency rumble audible in the background Nighttime: Insect noise dominant. Low

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													frequency rumble audible in the background

A.1.14 NSR 25-35

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 06 Aug 2020	N/A	29.3	29.6	N/A	31.5	31.6	N/A	20.2	21.1	N/A	22.8	24.9	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Audio data not available on this day due to file saving issues on device.
Sun, 07 Aug 2020	26.9	25.9	26.5	45.6	33.4	33.0	20.6	21.1	23.0	39.0	28.1	29.0	Daytime: Wind. Birds, vehicles. Low frequency rumble is audible - sounds like localised activity Evening: Reasonably quiet, limited extraneous noise. Low frequency rumble is

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													audible - sounds like localised activity Nighttime: Reasonably quiet, limited extraneous noise. Low frequency rumble is audible - sounds like localised activity
Mon, 08 Aug 2020	33.1	32.2	37.2	46.6	39.6	48.6	29.3	29.2	32.6	42.1	35.6	43.7	Daytime: Wind and trees rustling. Birds and light rain Evening: Wind and trees rustling. Birds also audible Nighttime: Wind, rain and trees rustling.
Tue, 09 Aug 2020	29.6	27.5	30.4	53.4	38.5	45.4	25.0	22.6	23.5	44.5	33.4	37.0	Daytime: Wind and rain noise is dominant. Low frequency rumble is audible - sounds like localised activity. Faint mobile equipment revs also audible during quiet periods. Evening: Vehicles, birds. Low frequency rumble is audible - sounds like localised activity. Faint mobile equipment revs also audible during quiet periods. Nighttime: Rain and wind.
Wed, 10 Aug 2020	34.1	37.6	36.1	50.3	57.2	51.6	28.8	32.7	30.4	44.7	47.7	43.0	Daytime: Rain and wind. Evening: Rain and wind. Nighttime: Rain and wind.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 11 Aug 2020	34.6	32.8	32.2	44.6	35.7	35.2	28.8	26.2	26.1	37.7	28.7	28.9	Daytime: Wind and rain noise dominant. Birds also audible. Low frequency rumble is audible - sounds like localised activity. Faint mobile equipment revs also audible during quiet periods. Evening: Wind and bird noise Nighttime: Wind and bird noise
Fri, 12 Aug 2020	31.7	30.7	30.0	39.1	34.5	35.7	26.4	24.4	23.6	31.9	28.1	29.7	Daytime: Wind noise dominant Evening: Wind noise dominant. Light rain. Localised fauna activity near monitor Nighttime: Bird and local traffic noise
Sat, 13 Aug 2020	29.8	28.2	28.5	40.2	34.5	36.6	23.4	21.3	21.5	33.0	22.5	24.0	Daytime: Traffic, birds, light wind and localised activity near monitor - trucks audible. Faint mobile equipment revs also audible during quiet periods. Evening: Insect and fauna noise (birds and ducks) dominant Nighttime: Insect and fauna noise (birds and ducks) dominant

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sun, 14 Aug 2020	28.9	28.8	28.6	38.3	38.1	38.3	23.0	21.9	21.7	29.3	25.6	25.6	Daytime: Traffic and bird noise dominant. Faint mobile equipment revs also audible during quiet periods. Evening: Insect and fauna noise (birds and ducks) dominant. Faint low frequency rumble in background Nighttime: Insect and fauna noise (ducks) dominant. Faint low frequency rumble in background
Mon, 15 Aug 2020	30.0	36.5	35.8	47.5	56.1	49.7	23.9	29.0	29.6	41.8	46.3	42.9	Daytime: Insect and fauna noise (ducks) dominant. Light rain also audible. Faint low frequency rumble in background Evening: Rain noise dominant Nighttime: Wind and rain noise dominant
Tue, 16 Aug 2020	33.3	34.6	33.5	46.7	51.9	43.7	27.6	27.8	27.1	39.9	42.5	34.9	Daytime: Wind, rain and bird noise Evening: Rain noise dominant Nighttime: Wind, rain and bird noise
Wed, 17 Aug 2020	34.7	32.5	32.0	47.1	40.2	40.7	30.1	25.8	25.1	42.2	31.8	32.1	Daytime: Wind, bird and traffic noise dominant Evening: Light rain. Birds. Very faint LF rumble in background during quiet periods (not dominant)

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Nighttime: Wind. Light rain. Birds. Trees rustling. Very faint ME in background during quiet periods (not dominant)
Thu, 18 Aug 2020	32.9	30.2	28.5	44.6	38.8	37.2	27.3	22.7	22.0	39.2	28.4	32.3	Daytime: Wind, trees rustling, birds, localised gardening activities and traffic Evening: insect and fauna noise (ducks) dominant Nighttime: insect and fauna noise (ducks) dominant. Traffic noise becomes dominant near dawn
Fri, 19 Aug 2020	29.5	28.9	26.9	38.5	38.8	34.2	22.5	20.4	20.1	30.6	26.5	29.9	Daytime: Vehicles, birds, Community noise (people talking). Very faint Low Frequency rumble in background during quiet periods (not dominant) Evening: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Nighttime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant)

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 20 Aug 2020	28.3	26.2	25.6	38.9	33.7	32.4	21.7	19.1	18.7	33.3	26.5	26.6	Daytime: Wind and trees rustling. Noise from birds and occasional traffic passing by Evening: Birds, insects and traffic noise dominant Nighttime: Birds and insects dominant.
Sun, 21 Aug 2020	26.5	25.8	25.9	38.2	30.7	31.4	19.5	19.3	20.8	28.6	22.8	25.4	Daytime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Evening: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Nighttime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant)
Mon, 22 Aug 2020	28.0	25.1	26.9	40.9	29.7	36.8	22.4	19.1	20.7	34.9	24.4	29.2	Daytime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Evening: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Nighttime: Vehicles, birds. Rain. LF rumble in

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													background during quiet periods (not dominant)
Tue, 23 Aug 2020	27.0	24.9	24.4	42.6	30.9	30.5	20.5	18.2	17.6	35.1	26.5	26.1	Daytime: light rain in morning, birds, tees rustling, traffic Evening: insects, ducks, community noise (music) Nighttime: insects, ducks, and traffic near dawn. Faint LF rumble in background during quiet periods (not dominant)
Wed, 24 Aug 2020	25.1	23.8	23.5	37.6	29.0	31.3	18.0	15.7	16.1	25.8	19.7	27.5	Daytime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Evening: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Nighttime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant)

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 25 Aug 2020	25.3	22.9	22.7	38.2	31.9	32.0	18.1	15.4	15.8	27.0	28.6	29.6	Daytime: Birds, light rain and community noise (people conversing near microphone) can be heard. Low Frequency rumble audible on occasions (quite faint). Evening: insects and ducks. Faint Mobile Equipment revs in background during quiet periods. Nighttime: Little extraneous noise however, insects, birds and local traffic towards dawn can be heard. Low Frequency rumble audible on occasions (quite faint).
Fri, 26 Aug 2020	26.11	22.66	22.95	38.88	28.73	30.17	19.0	15.5	15.9	29.7	25.6	27.6	Daytime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Evening: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant) Nighttime: Vehicles, birds. Very faint LF rumble in background during quiet periods (not dominant)

A.1.15 NSR 36

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 28 Aug 2020	N/A	31.3	19.8	N/A	46.9	36.4	N/A	28.2	13.2	N/A	43.2	32.2	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Daytime: Period incomplete and not assessed due to deployment time. Evening: Wind and rain. leaves rustling Nighttime: pitta patter of light rain. Insect and bird noise also audible
Sun, 29 Aug 2020	19.2	17.1	17.2	41.4	25.9	28.8	16.1	7.5	11.3	32.5	24.9	27.2	Daytime: Occasional windy period. Leaves Rustling. Extraneous bird noise. Etmylin Forest Tram(?) Passes on 2x occasions (~60 dBA when passing) Evening: Insect and bird noise. Cars passing. Faint LF noise - sounds like vehicle revving (not dominant), audible when little extraneous noise (less than 20 dBA - unfiltered) Nighttime: Cars passing at fairly regular intervals. Faint LF rumble noise (audible

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													when background noise less than 20 dBA - unfiltered)
Mon, 30 Aug 2020	20.0	19.1	17.2	43.0	24.8	30.7	15.6	15.5	11.5	41.8	23.7	29.3	Daytime: Wind and leaves rustling. Bird noise. Etmylin Forest Tram(?) passes on 2x occasions (~60 dBA when passing) Evening: Little extraneous noise. Cars passing at fairly regular intervals Nighttime: Little extraneous noise. Traffic begins at 4am and dominates
Tue, 31 Aug 2020	25.2	37.7	26.5	43.8	50.3	49.7	20.4	34.6	22.6	39.8	43.2	40.8	Daytime: Birds and traffic up to 10AM. Post 10AM - wind. Evening: Wind and rain Nighttime: Wind and rain. Light rain from 4AM onwards
Wed, 01 Sep 2020	28.1	18.3	25.6	50.2	35.8	43.6	23.9	11.9	22.6	46.3	31.6	36.4	Daytime: Wind and rain Evening: Little extraneous noise. Rain and wind from 2030 onwards Nighttime: wind and rain
Thu, 02 Sep 2020	26.9	16.8	17.5	46.2	20.5	26.3	22.7	7.2	8.9	42.3	15.7	22.5	Daytime: wind and rustling leaves. Bird noise from 1700 onwards when wind dies down. Evening: insects. Occasional very faint

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													LF rumble (and what sounds like occasional revving - faint as well) - operations noise. Audible when background levels <20 dBA Nighttime: insects. Light breeze and lightly rustling leaves. Occasionally audible faint LF rumble (and what sounds like occasional revving - faint as well). Audible when background levels <20 BA
Fri, 03 Sep 2020	24.1	18.2	17.2	44.0	26.8	25.8	18.9	10.9	8.1	39.5	22.7	19.7	Daytime: Birds up till 0830. Wind for rest of period Evening: Mostly light wind and rustling leaves. Wind dies down around 2145. Nighttime: insects and fauna noise. Traffic post 0500
Sat, 04 Sep 2020	21.5	17.7	17.2	37.7	20.1	24.4	14.5	11.4	8.9	31.2	15.9	18.1	Daytime: Bird noise up to 9AM, then wind noise and trees rustling Evening: Very little extraneous noise. Insect and fauna noise faintly audible Nighttime: Very little extraneous noise.

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Insect and fauna noise faintly audible. Bird noise dominant from 0500
Sun, 05 Sep 2020	26.4	21.7	24.4	44.8	36.4	46.3	19.0	16.9	20.5	41.1	29.9	42.3	Daytime: Wind and Etmylin Forest Tram(?) passes on 2x occasions (~50 dBA when passing) Evening: Rain. Wind and trees rustling. Nighttime: Rain. Wind and trees rustling. Insects also audible on occasions
Mon, 06 Sep 2020	39.7	26.2	23.0	55.1	50.6	42.7	34.5	21.4	18.6	49.8	41.6	32.6	Daytime: Rain and wind Evening: Rain. Wind and trees rustling. Nighttime: Rain with gusting winds. Birds dominant post 0530
Tue, 07 Sep 2020	27.1	17.8	17.5	44.3	25.3	31.1	22.3	8.6	8.0	38.8	23.2	24.6	Daytime: Bird chatter. Wind and trees rustling. Evening: Insect and fauna (sounds like duck?) noise. Occasional traffic noise. Nighttime: Rain. Insect and fauna noise. Bird and traffic noise dominant post 0530.

A.1.16 NSR 37

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 28 Aug 2020	N/A	35.1	22.5	N/A	52.3	46.2	N/A	31.7	16.1	N/A	48.3	40.3	The logger was deployed on this day and data was recorded for only part of the relevant day/evening/ night period and is therefore not deemed representative Daytime: Periods incomplete and not assessed due to deployment time. Evening: Wind and rain. leaves rustling Nighttime: Wind and rain. leaves rustling. Post 5AM, consistent traffic
Sun, 29 Aug 2020	25.1	18.0	18.8	50.8	38.1	39.7	21.4	8.8	13.0	49.1	37.3	38.4	Daytime: Wind and fairly consistent traffic Evening: Fairly consistent traffic noise. Low levels when no traffic (<20 dBA) Nighttime: Traffic noise (approx. 5 cars per hours). Low levels when no traffic (< 20 dBA). Very faint low frequency rumble audible during quiet periods. Traffic noise becomes consistent post 0430
Mon, 30 Aug 2020	21.4	19.5	18.7	51.5	38.0	44.6	17.3	14.6	12.2	50.0	37.1	44.0	Daytime: Traffic noise. Bird Chatter. Wind noise and trees rustling

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
													Evening: Fairly consistent traffic noise. Low levels when no traffic (~20 dBA) Nighttime: Occasional car. Low levels when no traffic (~20 dBA). Traffic becomes consistent and dominant from 0400
Tue, 31 Aug 2020	30.7	40.0	35.6	52.0	56.7	57.6	28.0	37.1	29.5	49.8	49.0	48.8	Daytime: Consistent traffic throughout day. Wind noise Evening: Traffic. Wind, and rain (later in period) Nighttime: Rain. Traffic audible post 0400
Wed, 01 Sep 2020	36.2	19.3	29.0	55.3	44.3	50.8	32.5	13.7	24.9	52.0	38.2	44.3	Daytime: Fairly constant traffic. Wind and trees rustling. Rain during early morning and afternoon Evening: Traffic noise. Rain Nighttime: Wind. Periods of rain. Traffic audible from 0430

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Thu, 02 Sep 2020	35.2	18.0	18.9	53.1	34.0	40.6	32.4	9.1	12.2	49.7	31.8	39.4	Daytime: Wind, trees rustling. Some rain. Fairly constant traffic noise in afternoon Evening: Traffic noise (approx. 5 cars per hours). Low levels when no traffic (~20 dBA). Nighttime: Traffic noise (approx. 2-3 cars per hours). Periods of wind. Low levels when no traffic (~20 dBA). Wind / Traffic from 0300 onwards
Fri, 03 Sep 2020	31.1	20.9	18.6	51.2	36.6	37.2	28.4	14.9	10.9	49.0	34.4	34.6	Daytime: Constant traffic noise throughout day. Light wind and trees rustling. Birds chirping Evening: Light wind and trees rustling. Fairly constant traffic noise. Faint low frequency rumble during quiet periods (~20 dBA). Nighttime: Periods of wind noise and rustling trees. Traffic dominant from 0400. Faint low frequency rumble during quiet periods (~20 dBA)

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Sat, 04 Sep 2020	25.6	18.6	18.2	50.7	39.8	36.4	21.2	12.4	10.3	48.8	38.5	30.7	Daytime: Traffic. Bird Chatter. Occasional windy period Evening: Fairly frequent traffic. Low levels when no traffic (~20 dBA) Nighttime: Traffic noise (approx. 3-4 cars per hours). Faint community noise (music) audible during time of no traffic. Rain from 2AM onwards
Sun, 05 Sep 2020	32.7	30.5	33.5	50.9	43.4	51.2	28.6	26.5	28.3	48.7	38.2	46.8	Daytime: Bird Chatter early in morning. Wind and traffic noise for rest of period Evening: Traffic noise. Wind and rustling trees. Nighttime: Rain, wind and rustling trees. Traffic also audible post 0500
Mon, 06 Sep 2020	46.1	29.3	28.3	61.0	57.8	51.9	41.4	22.7	22.2	54.8	47.4	43.9	Daytime: Rain and wind Evening: Rain, wind and rustling trees Nighttime: Rain, wind and rustling trees. Traffic and birds chirping post 0400

Date	L90 Background Levels, dBA			L10 Background Levels, dBA			L90 (40 Hz - 1 kHz) Background Levels, dBA			L10 (40 Hz - 1 kHz) Background Levels, dBA			Audio Comments
	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	L90, 12h Day	L90, 3h Evening	L90, 9h Night	L10, 12h Day	L10, 3h Evening	L10, 9h Night	
Tue, 07 Sep 2020	32.0	18.0	17.8	52.4	39.8	44.7	29.4	9.4	8.1	49.9	38.9	40.9	Daytime: Birds chirping. Traffic, wind, rain and trees rustling Evening: Traffic. Fauna noises audible during periods of low traffic Nighttime: Little extraneous noise until 1am. Light rain from 0100 onwards. Traffic and Birds chirping from 0400 onwards

APPENDIX B ASSUMED EQUIPMENT SOUND POWER LEVELS

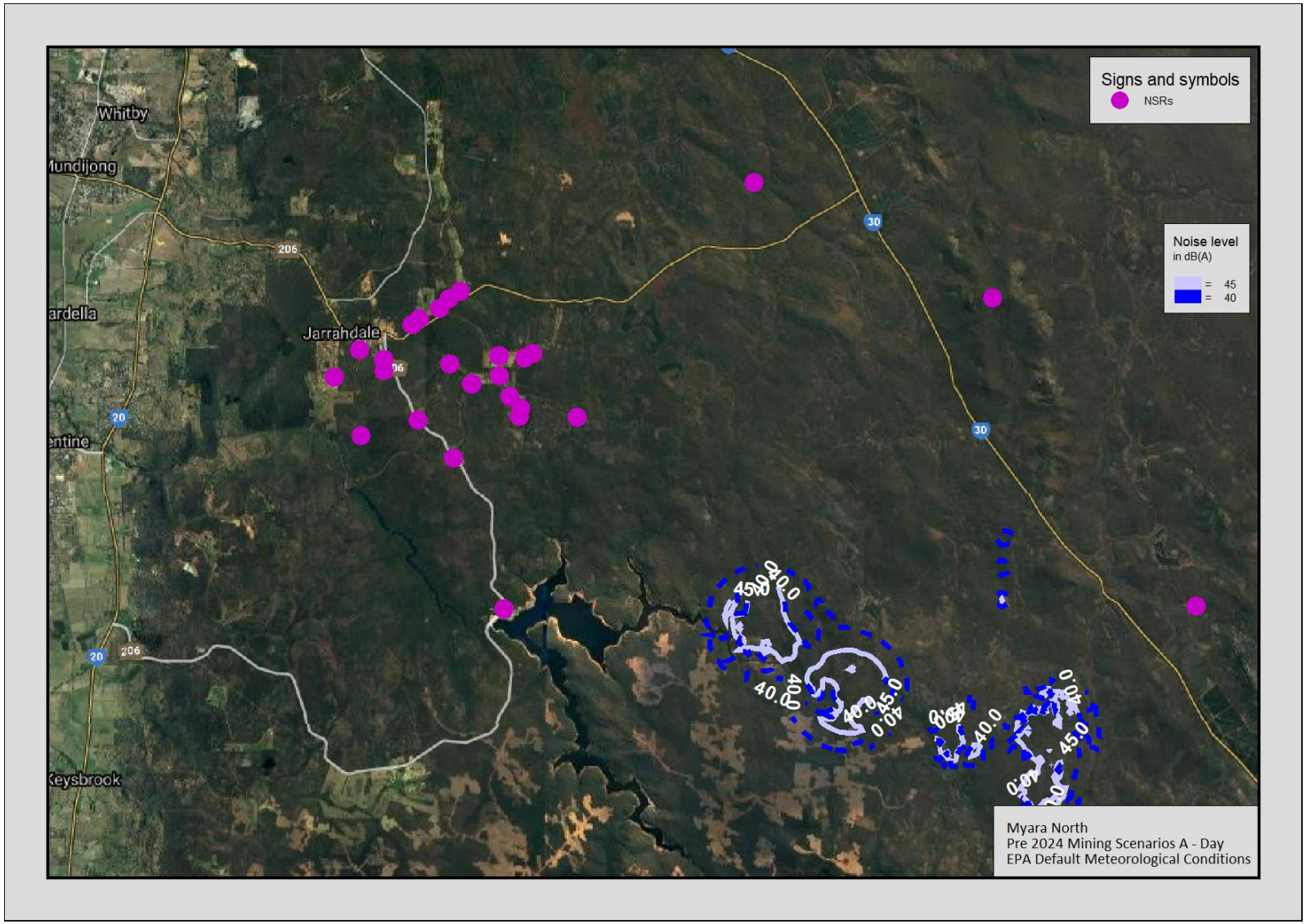
Equipment Type	SWL, dB(A)	Octave Band Sound Power Level, (dB)								
		31Hz	63Hz	125Hz	250Hz	500Hz	1khz	2kHz	4kHz	8kHz
Mobile Equipment										
Excavators 250T	116.0	106.0	115.0	122.0	113.0	114.0	111.0	107.0	100.0	96.0
150T Haul Trucks	120.2	111.0	114.0	119.0	118.0	118.0	115.0	113.0	106.0	100.0
Rock breaking Excavators	109.4	116.0	110.6	107.4	109.2	104.5	105.7	101.5	95.4	87.3
Loaders 993K	113.0	100.2	111.0	121.6	109.3	109.5	107.8	105.2	95.3	90.0
Loader 994	116.4	101.0	110.0	121.0	115.0	116.0	110.0	106.0	101.0	94.0
Contractor loaders	116.4	101.0	110.0	121.0	115.0	116.0	110.0	106.0	101.0	94.0
Watercarts	99.2	98.9	98.3	100.4	100.2	94.6	93.5	93.0	84.1	74.8
Graders	107.7	100.9	99.7	107.5	104.8	102.5	104.4	99.8	95.1	91.1
Floats*	-									
Dozers	115.9	111.0	115.2	124.1	115.2	115.0	108.2	105.3	100.2	94.3
Scrapers	115.4	108.4	107.8	116.7	116.0	112.4	109.6	107.7	102.4	97.3

Equipment Type	SWL, dB(A)	Octave Band Sound Power Level, (dB)								
		31Hz	63Hz	125Hz	250Hz	500Hz	1khz	2kHz	4kHz	8kHz
Excavators for Soil & Overburden removal	109.4	116.0	110.6	107.4	109.2	104.5	105.7	101.5	95.4	87.3
Blast drills	114.2	67.3	85.0	99.8	109.1	111.4	110.5	106.8	99.7	90.9
Ancillary loaders	115.8	102.5	123.2	123.0	113.1	110.9	110.5	109.1	101.1	96.8
Ancillary trucks	120.2	110.3	112.1	118.7	118.0	118.8	115.2	111.4	106.1	98.9
Dual Powered Road Trains	123.1	115.0	118.0	127.0	126.0	120.0	118.0	112.0	107.0	98.0
Fixed Plant										
ROM Primary and Secondary Sizer (3,300 tph)	114.1	119.4	121.4	119.6	116.7	111.2	107.2	104.3	99.9	89.4
Diesel Generator (1.12 MW) – Myara North Transfer Station	109.6		90.3	97.2	100.5	102.0	103.0	103.0	101.8	103.3

Equipment Type	SWL, dB(A)	Octave Band Sound Power Level, (dB)								
		31Hz	63Hz	125Hz	250Hz	500Hz	1khz	2kHz	4kHz	8kHz
Diesel Generator (0.6 MW) – Myara North Fixed Infrastructure Area	104.6		85.3	92.2	95.5	97.0	98.0	98.0	96.8	98.3
Overland Conveyors	86.1	77.0	85.6	89.8	87.4	82.4	82.3	75.6	68.7	60.8
Misc Pumps 1 x Sewage Pump 1 x Reservoir Pump 1 x Chlorination/ Potable Water Pump 3 x HV Diesel Fuel Pump 1 x Waste Water Sump Pump	95.9	97.2	93.2	97.6	95.8	93.2	90.9	86.6	82.9	81.1

Note: * Not a continuously operating source and excluded from noise model

APPENDIX C MYARA NORTH NOISE CONTOURS


Signs and symbols
NSRs
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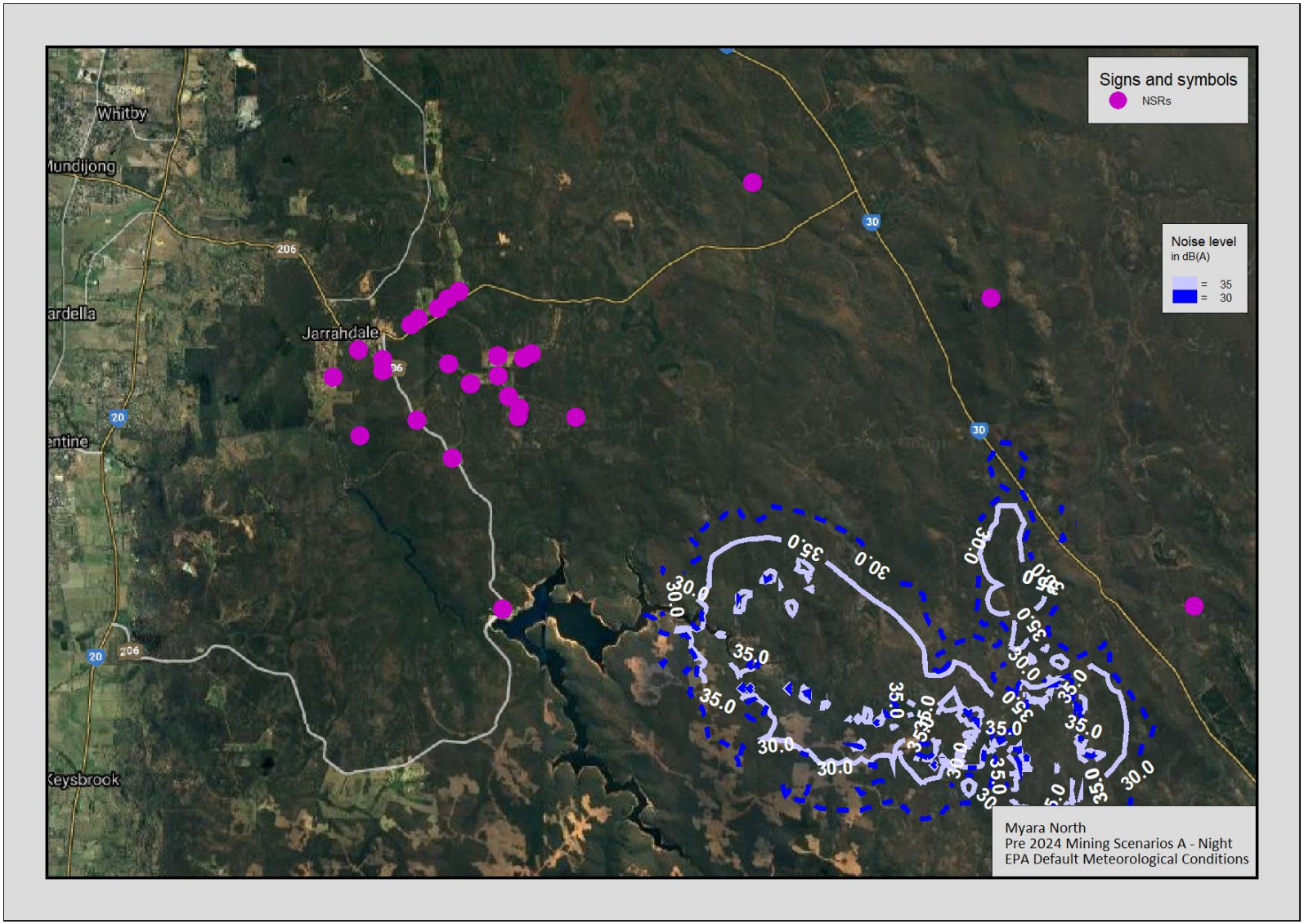
Keysbrook
206
30
20
Myara North
Pre 2024 Mining Scenarios A - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Noise level
in dB(A)
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Jarrahdale
Keysbrook
206
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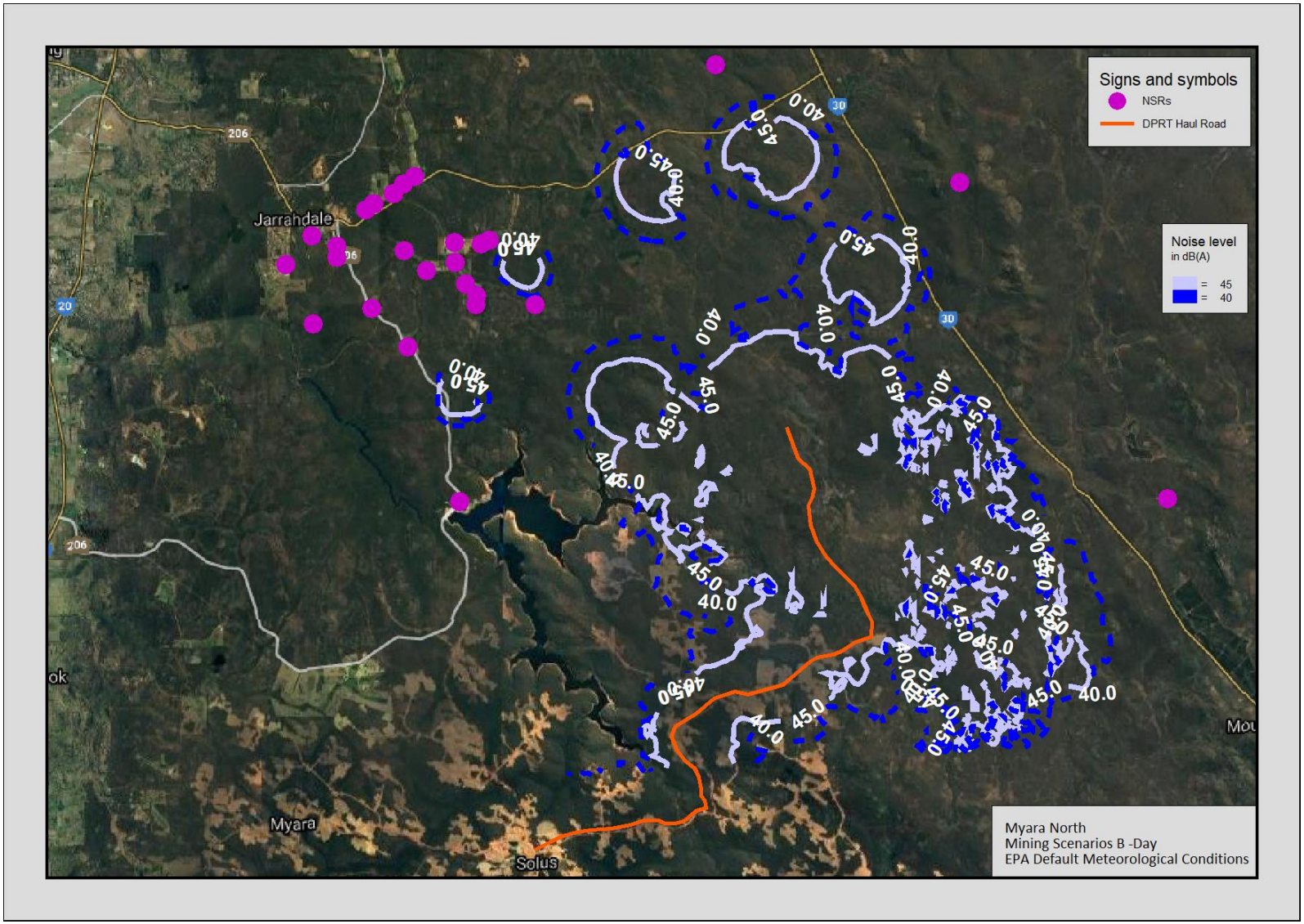
30
35.0
30.0
Myara North
Pre 2024 Mining Scenarios A - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
DPRT Haul Road
Noise level
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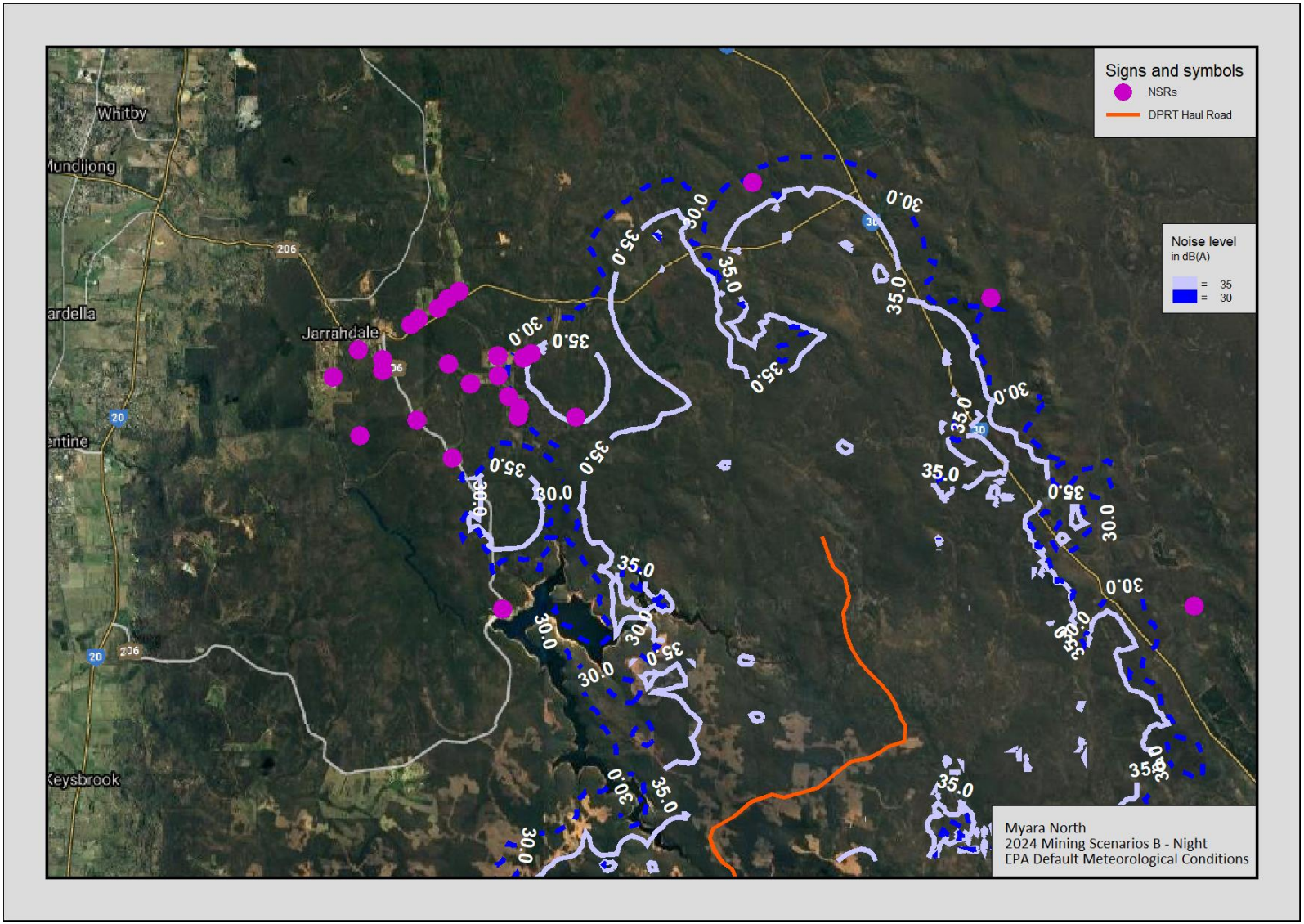
Jarrahdale
Myara
Solus
Myara North
Mining Scenarios B -Day
EPA Default Meteorological Conditions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DPRT Haul Road
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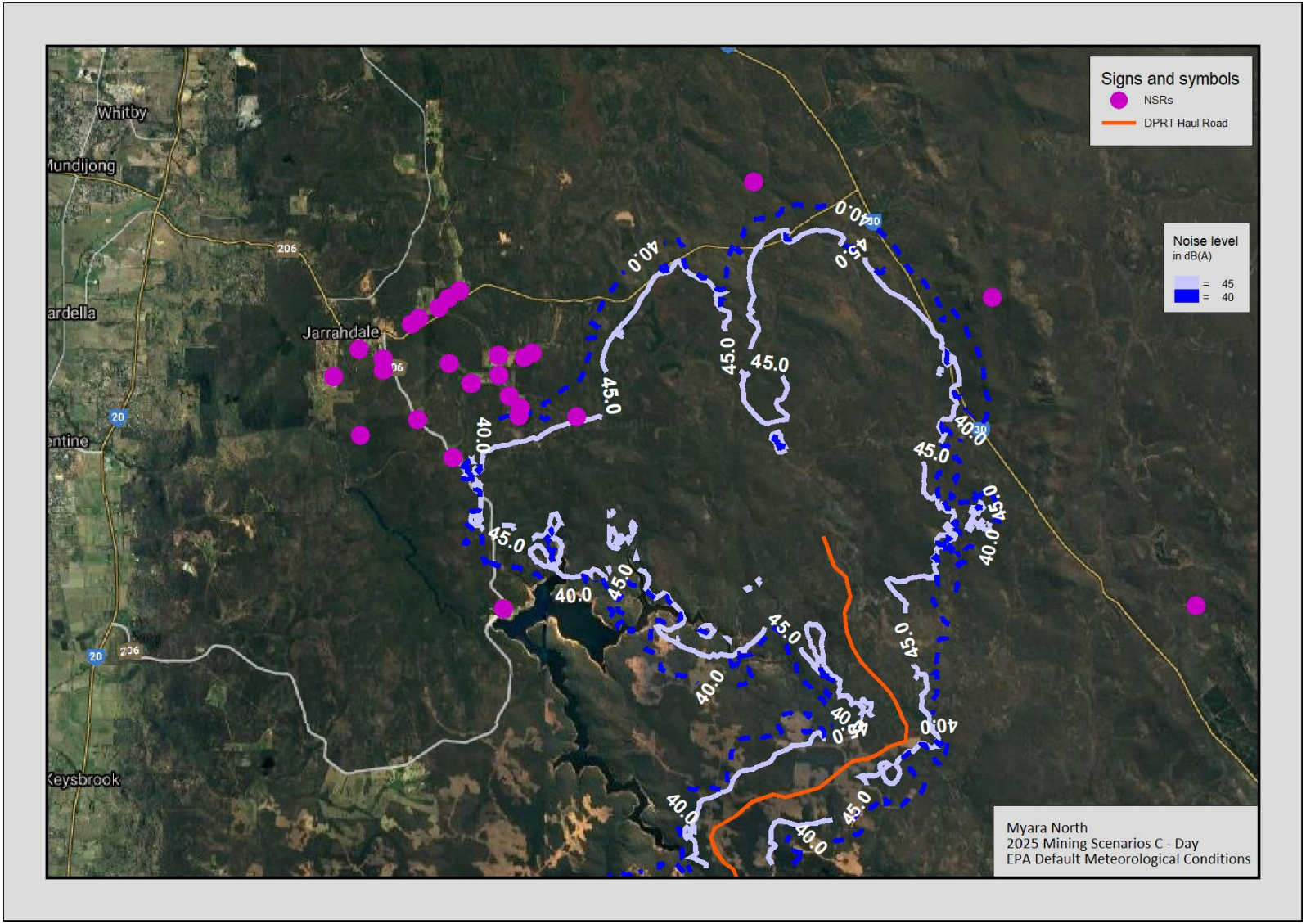
Keysbrook
206
Myara North
2024 Mining Scenarios B - Night
EPA Default Meteorological Conditions


Signs and symbols
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DPRT Haul Road
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Keysbrook
206
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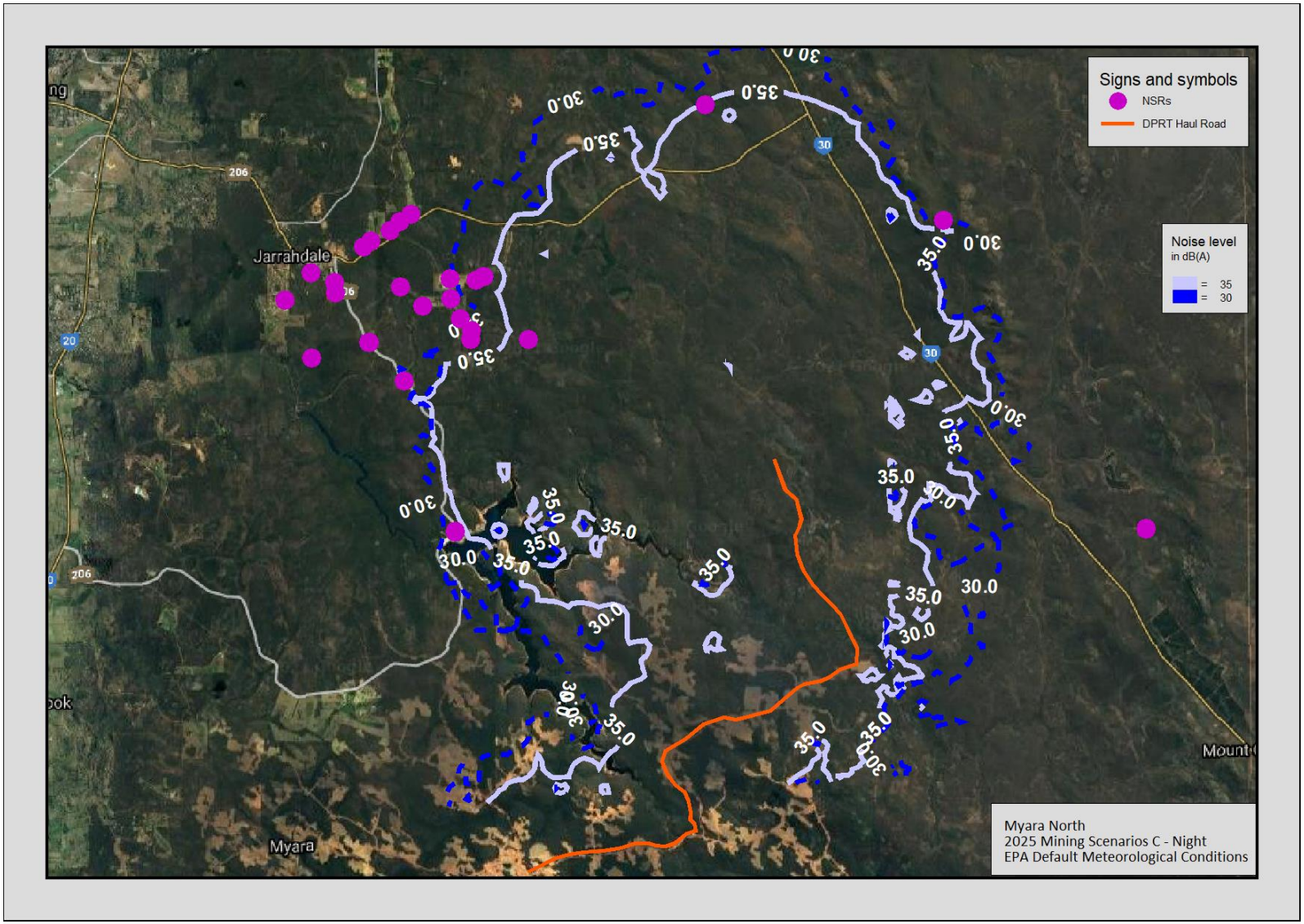
Myara North
2025 Mining Scenarios C - Day
EPA Default Meteorological Conditions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NSRs
DPRT Haul Road
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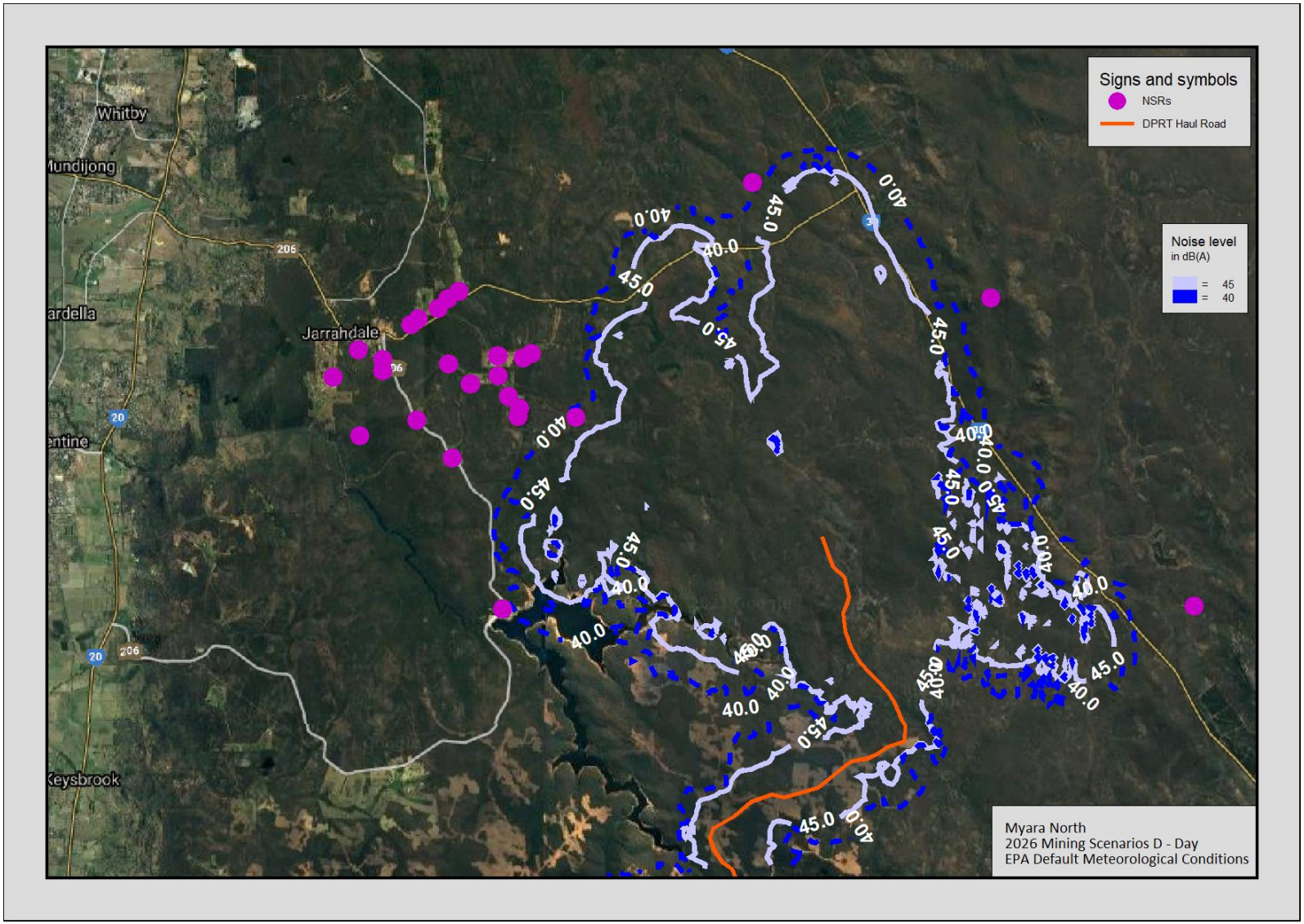
Myara
Myara North
2025 Mining Scenarios C - Night
EPA Default Meteorological Conditions


Signs and symbols
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DPRT Haul Road
Noise level
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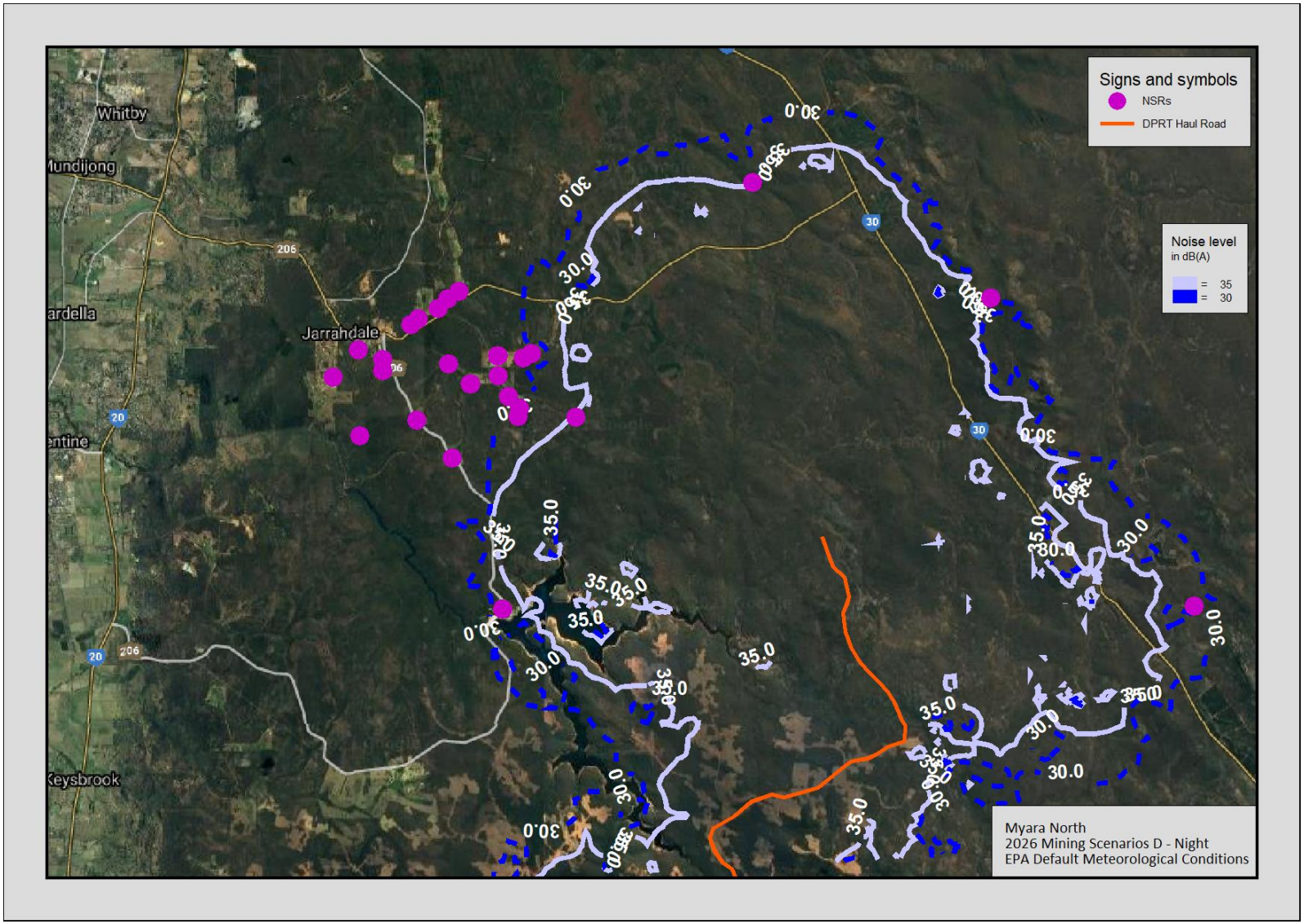
Keysbrook
206
20
Myara North
2026 Mining Scenarios D - Day
EPA Default Meteorological Conditions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DPRT Haul Road
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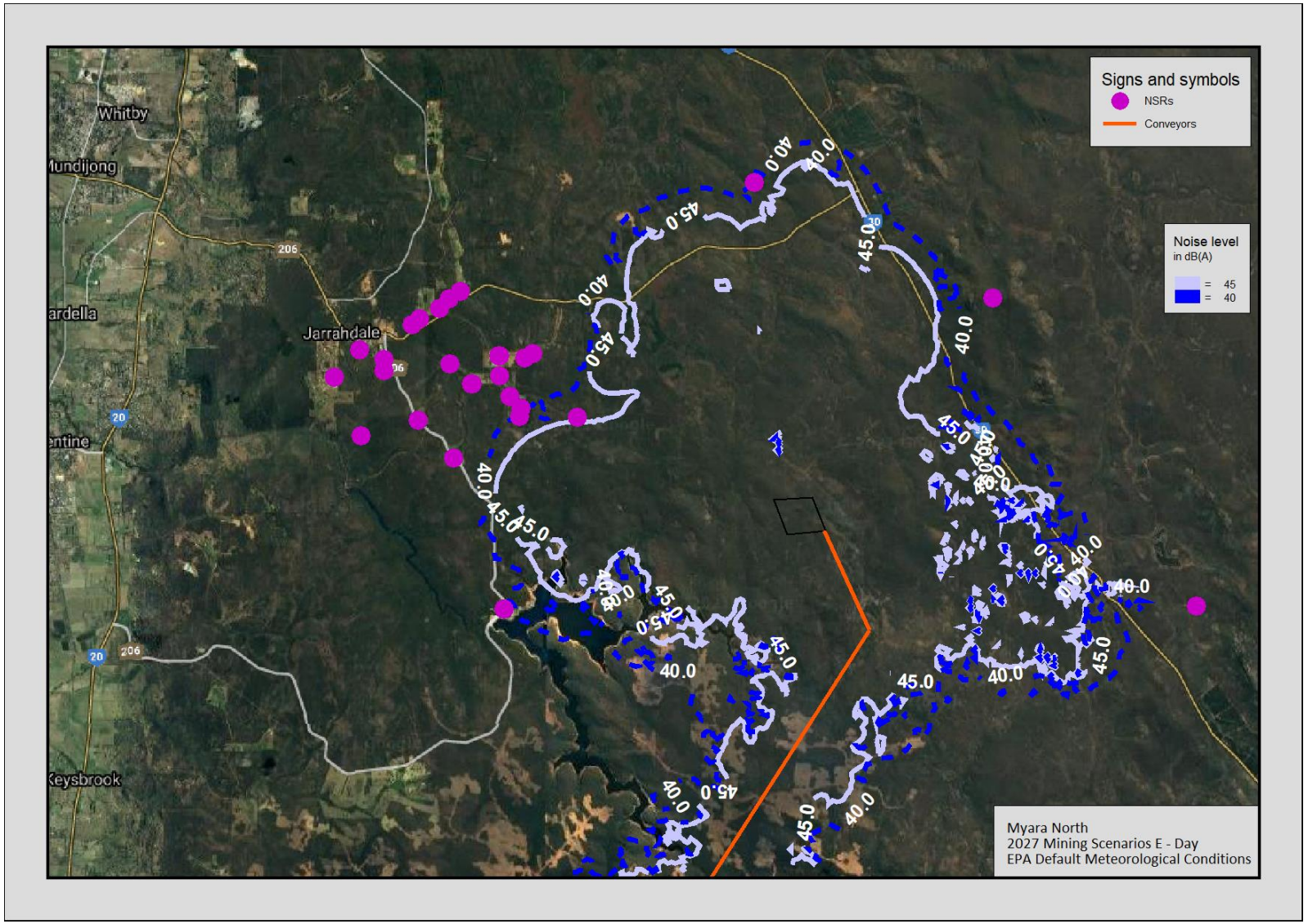
Keysbrook
Myara North
2026 Mining Scenarios D - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
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= 40
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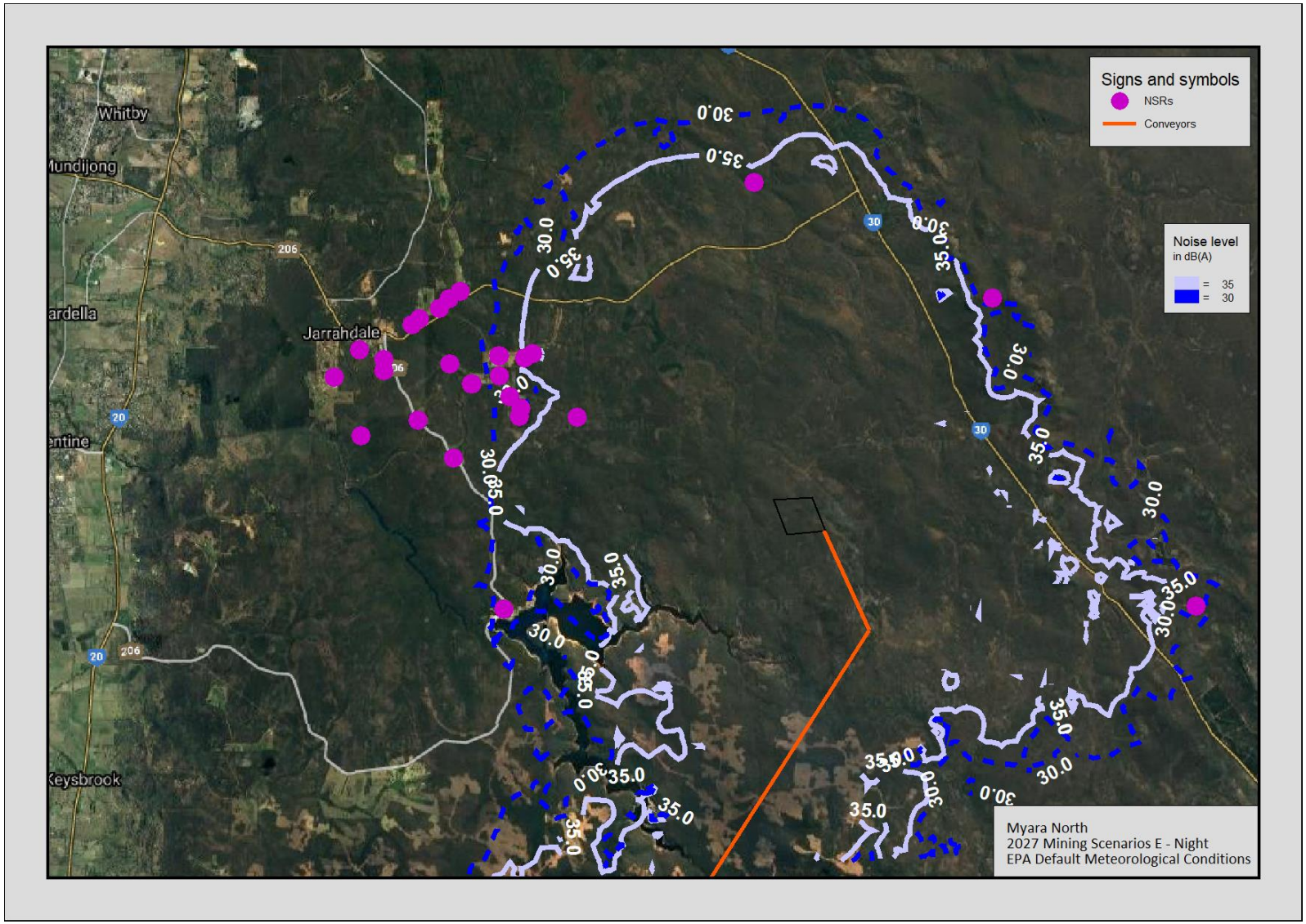
Keysbrook
206
20
Myara North
2027 Mining Scenarios E - Day
EPA Default Meteorological Conditions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Conveyors
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Jarrahdale
Keysbrook
206
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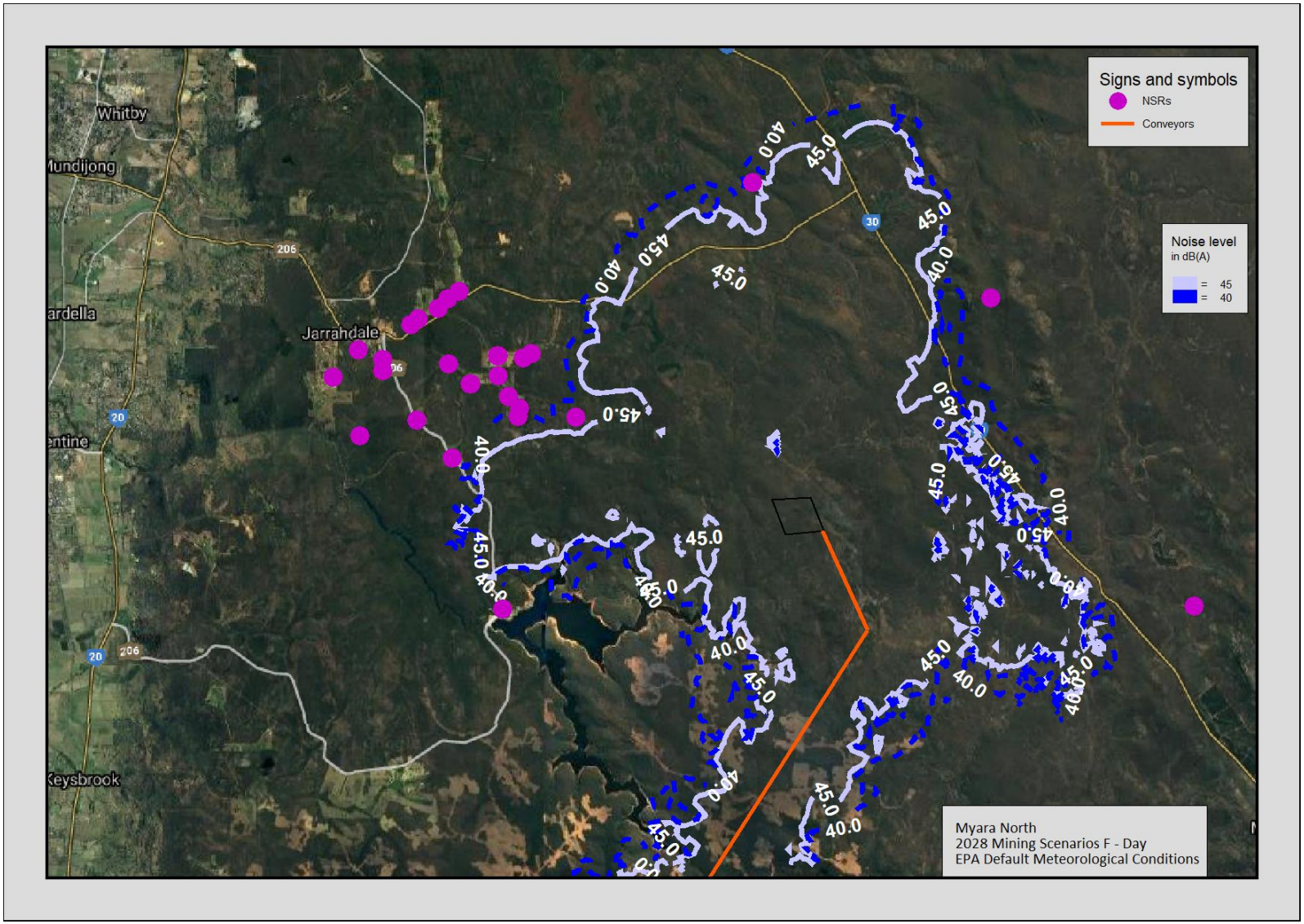
30.0
35.0
Myara North
2027 Mining Scenarios E - Night
EPA Default Meteorological Conditions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Conveyors
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in dB(A)
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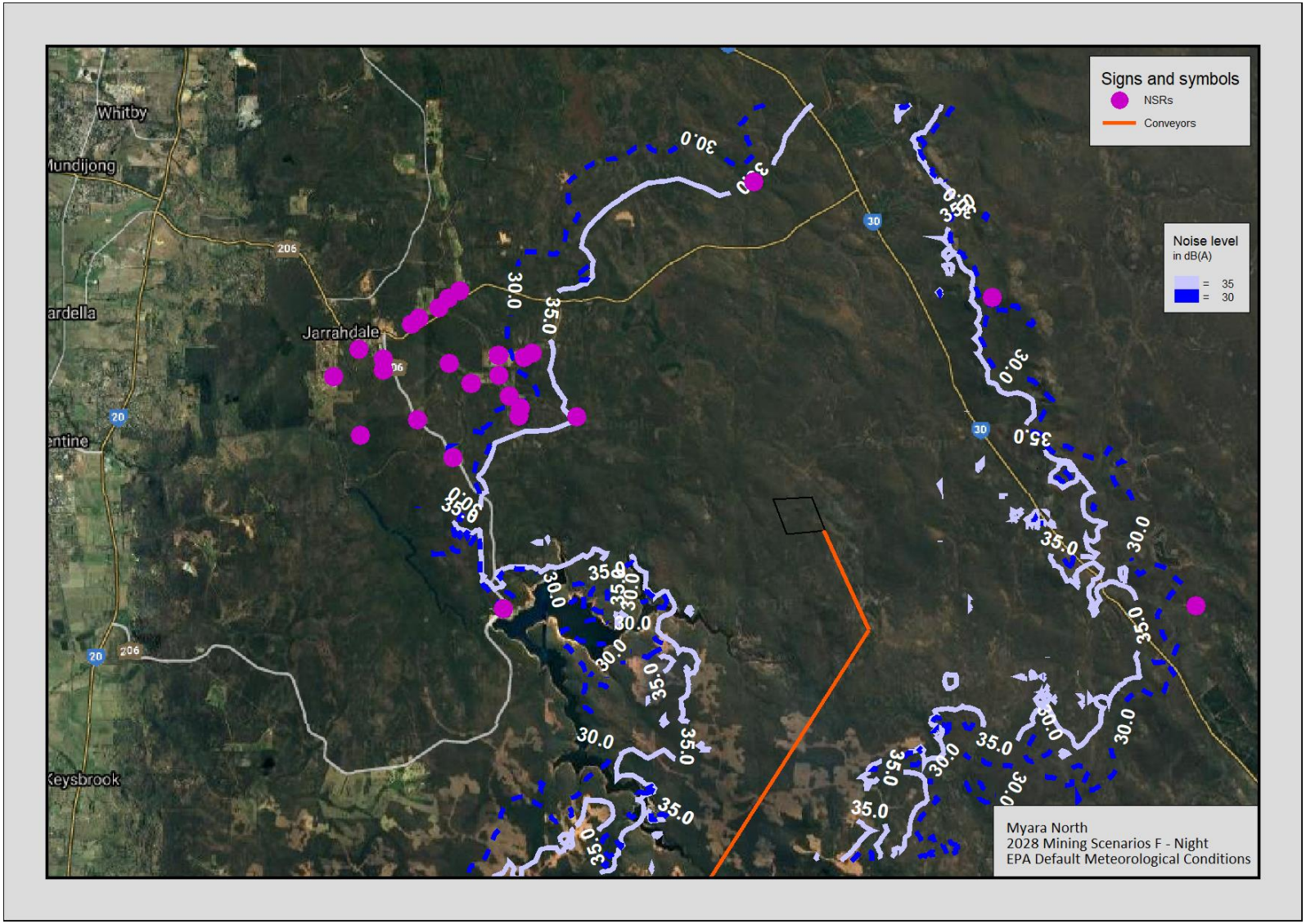
Jarrahdale
Keysbrook
206
20
30
Myara North
2028 Mining Scenarios F - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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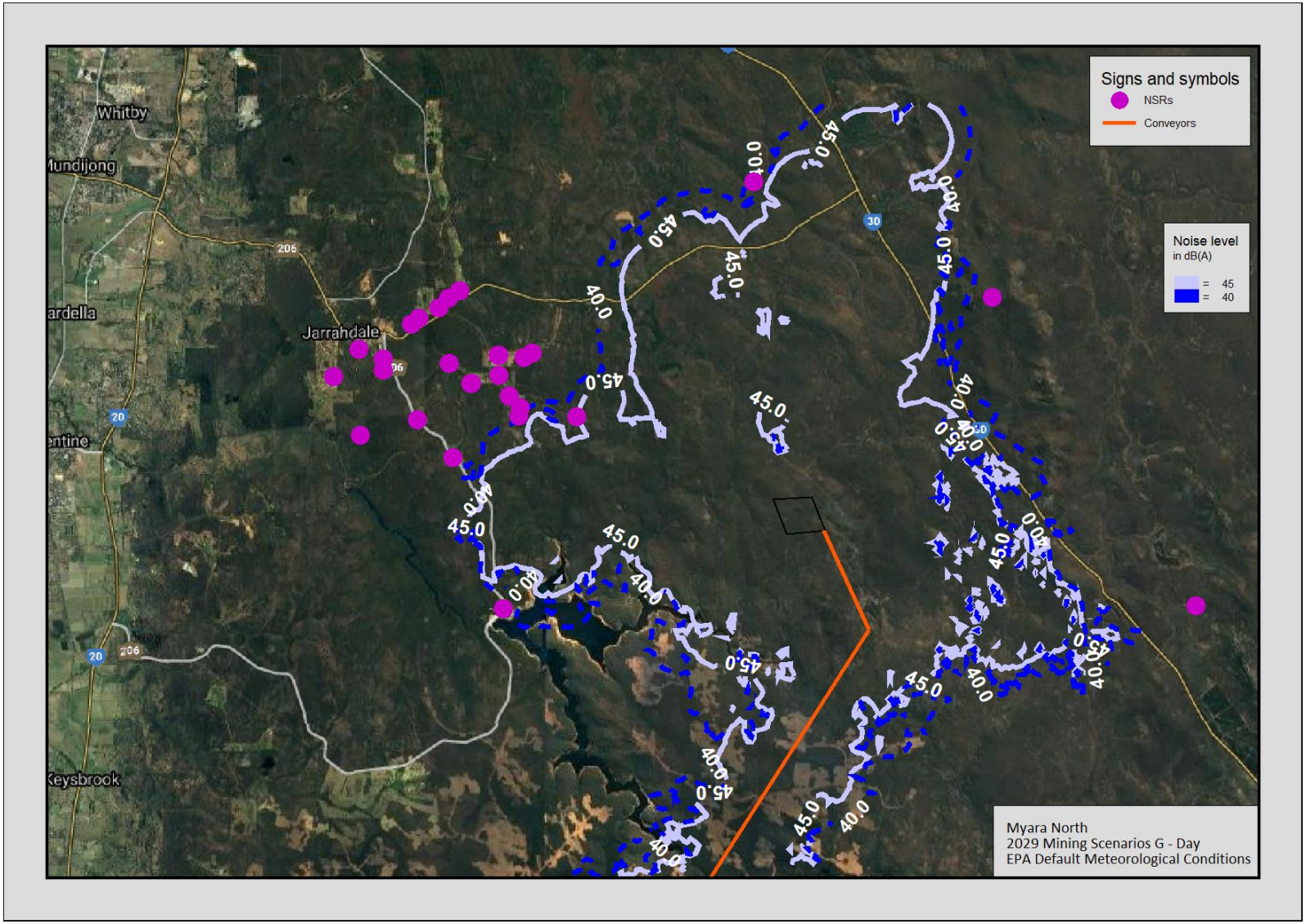
Jarrahdale
Keysbrook
206
20
30
Myara North
2028 Mining Scenarios F - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
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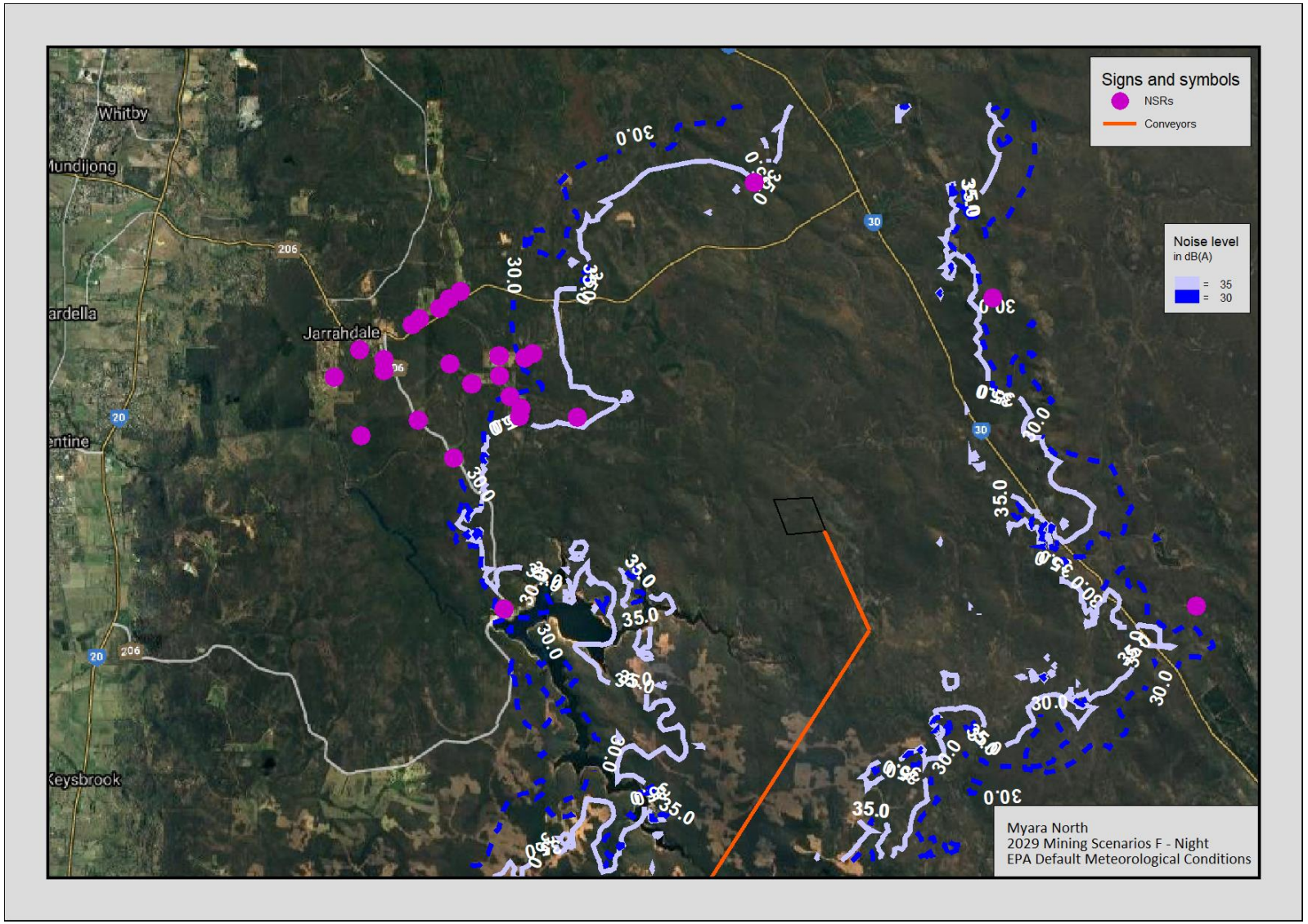
Whitby
Jarrahdale
Keysbrook
206
20
30
Myara North
2029 Mining Scenarios G - Day
EPA Default Meteorological Conditions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Conveyors
Noise level
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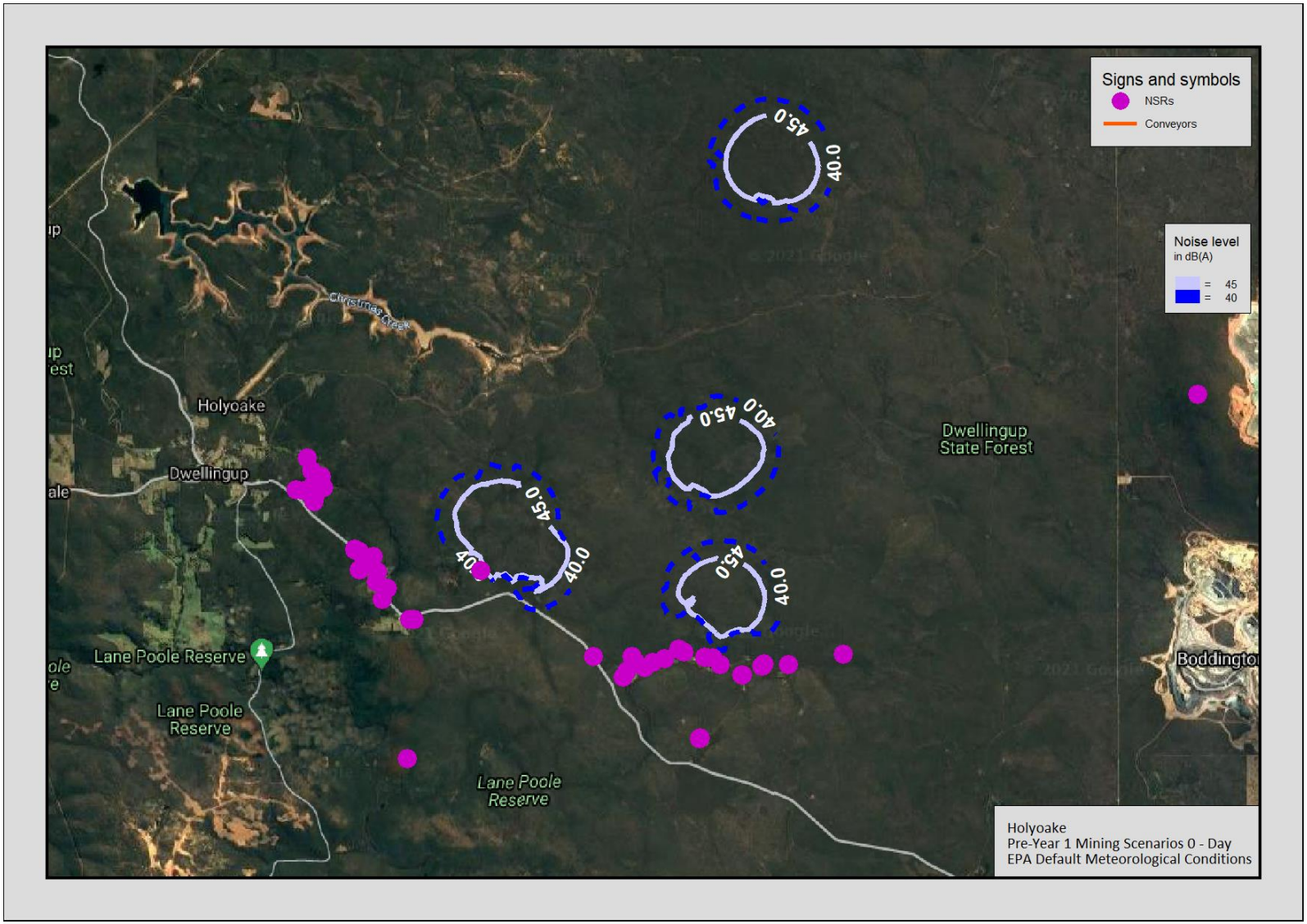
Whitby
Jarrahdale
Keysbrook
206
20
30
Myara North
2029 Mining Scenarios F - Night
EPA Default Meteorological Conditions

APPENDIX D HOLYOAKE NOISE CONTOURS


Signs and symbols
NSRs
Conveyors
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in dB(A)
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= 40
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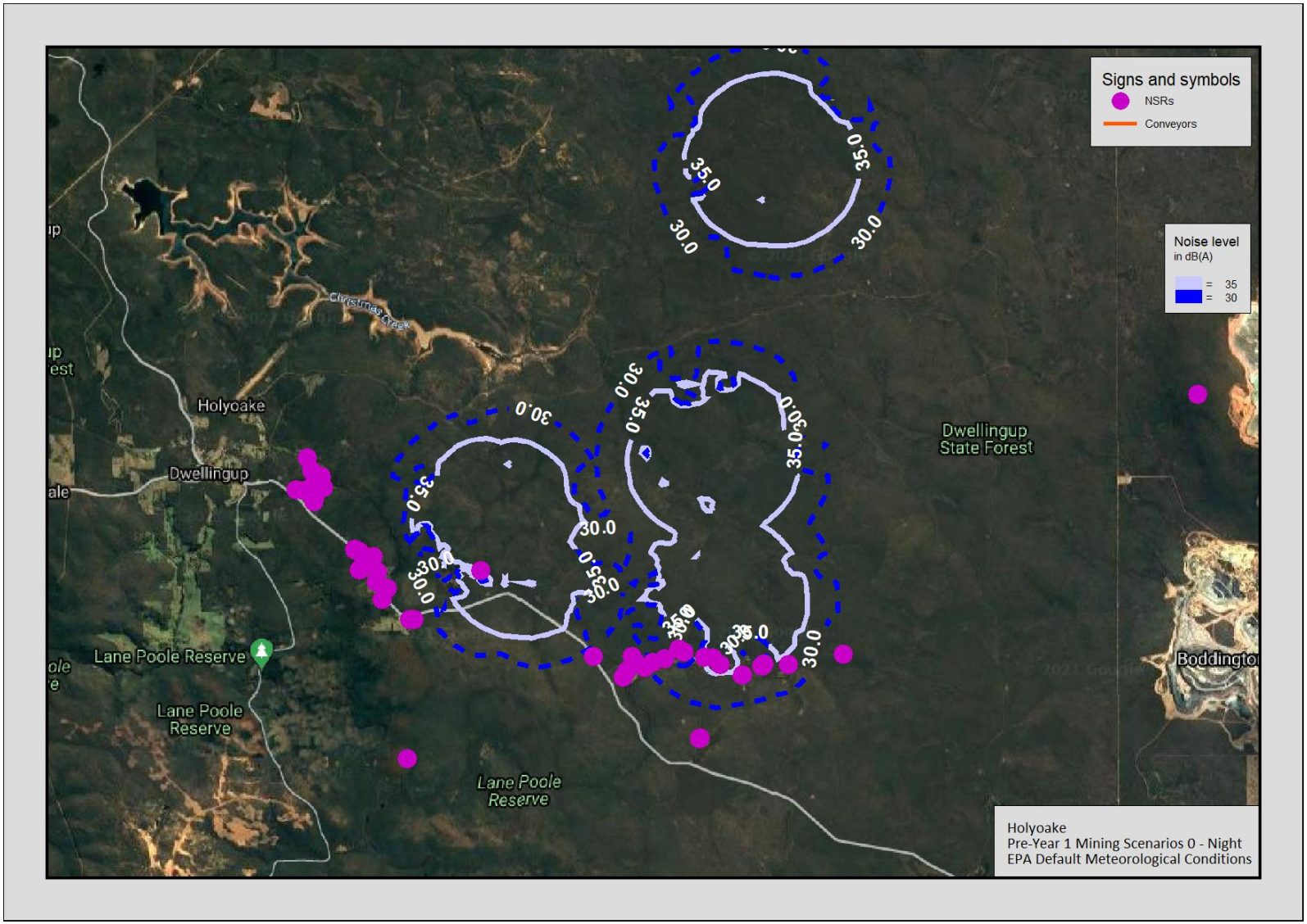
40.0
Christmas Creek
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Holyoake
Pre-Year 1 Mining Scenarios 0 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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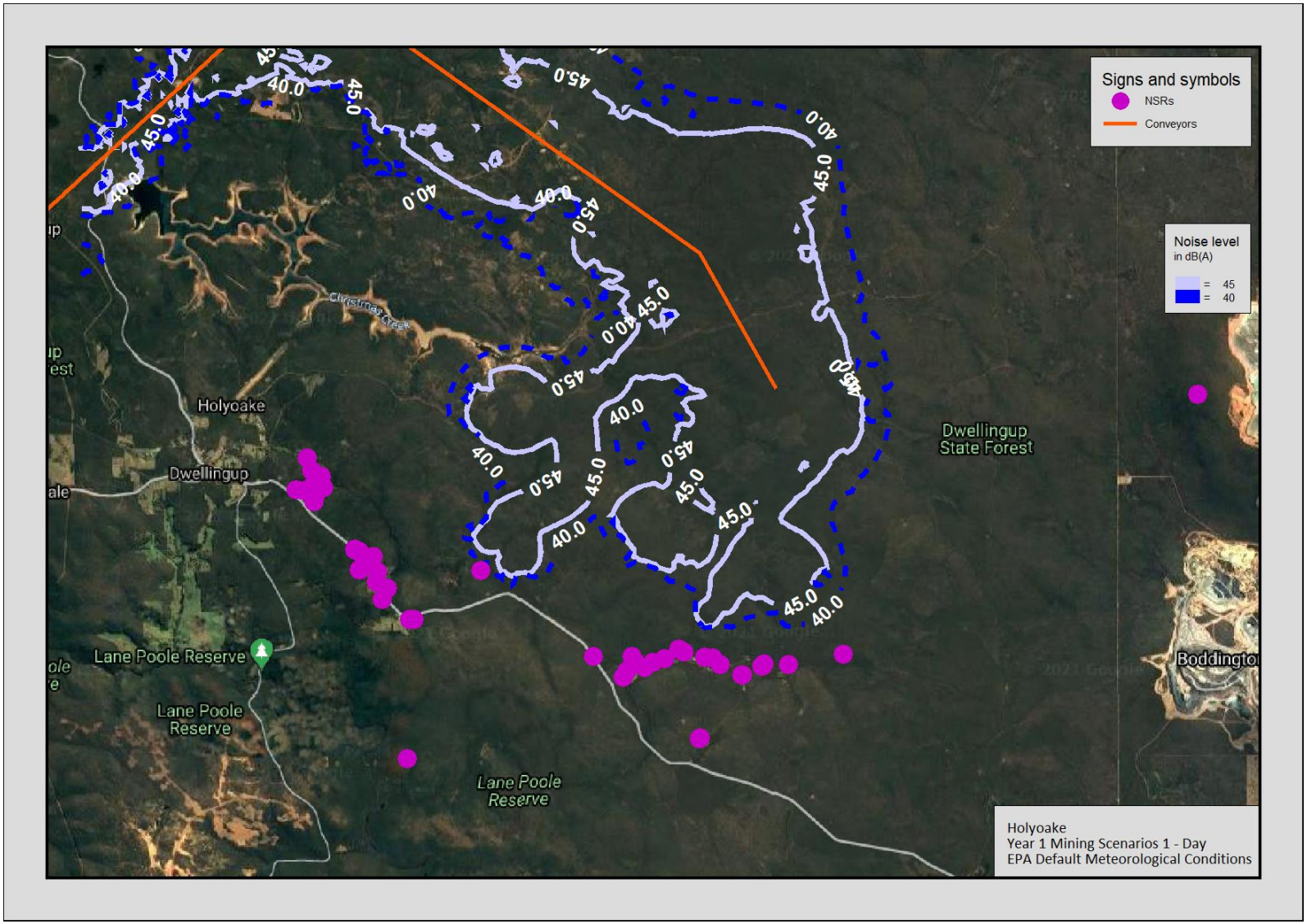
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake
Pre-Year 1 Mining Scenarios 0 - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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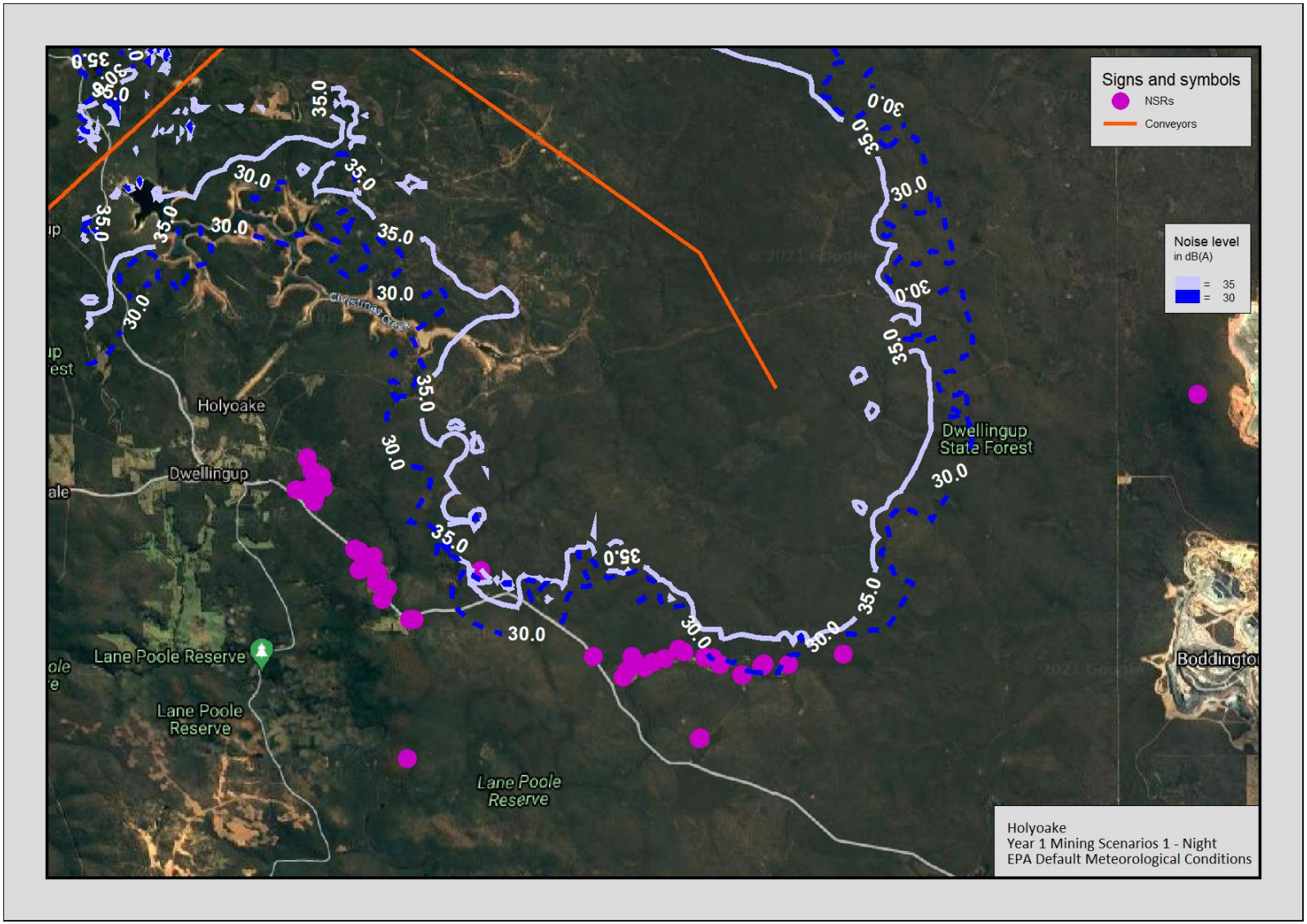
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake
Year 1 Mining Scenarios 1 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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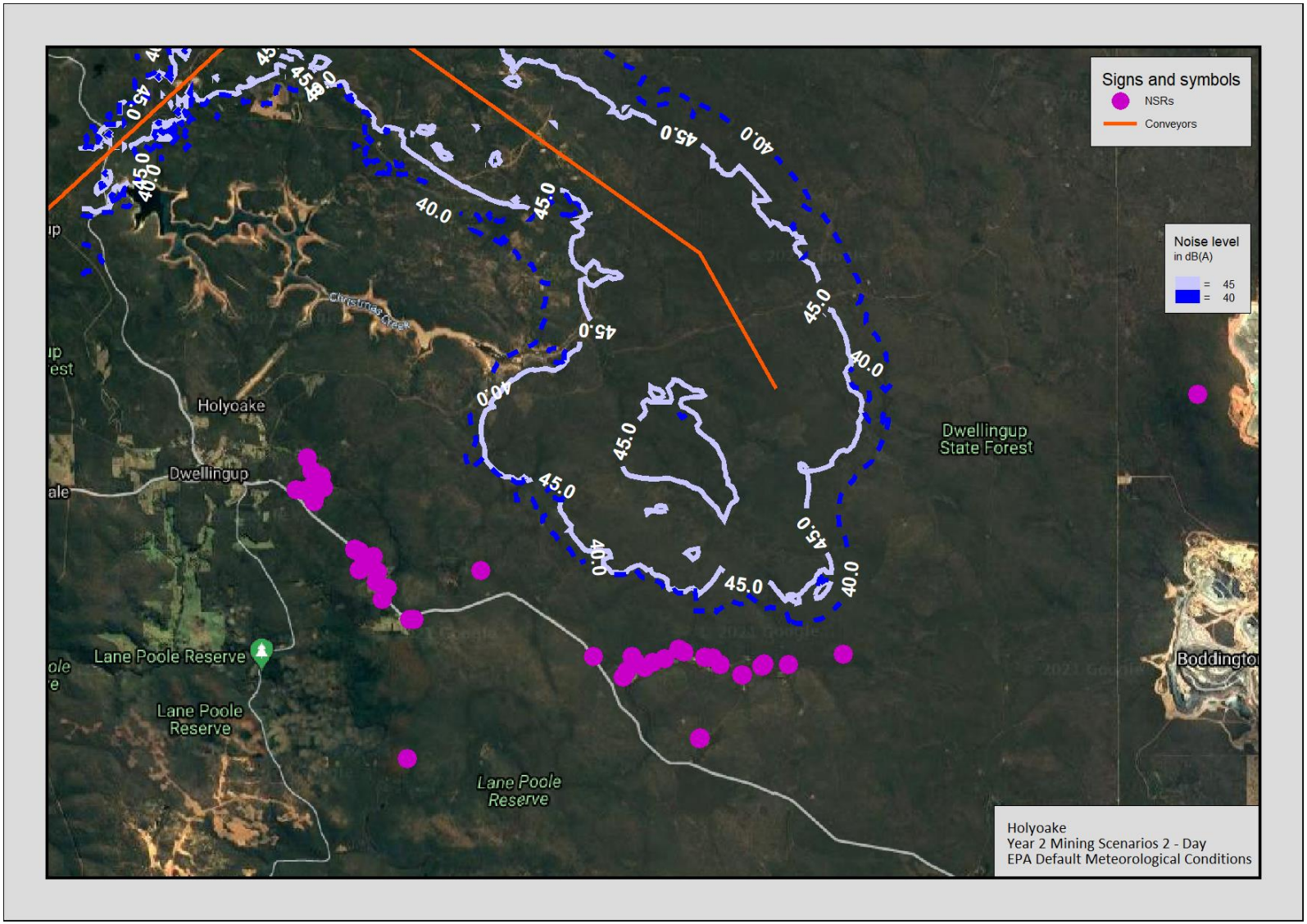
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake
Year 1 Mining Scenarios 1 - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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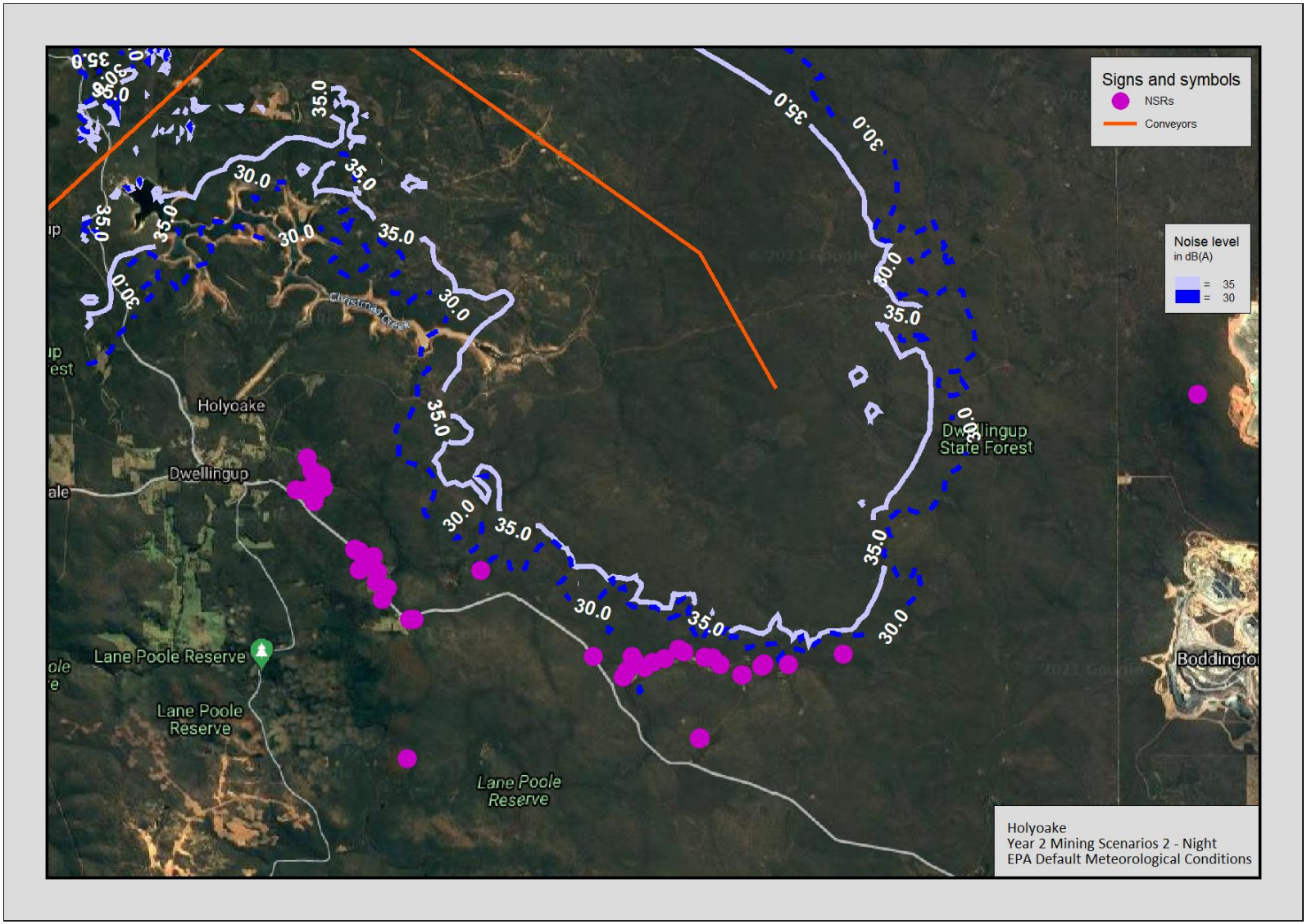
= 40
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake
Year 2 Mining Scenarios 2 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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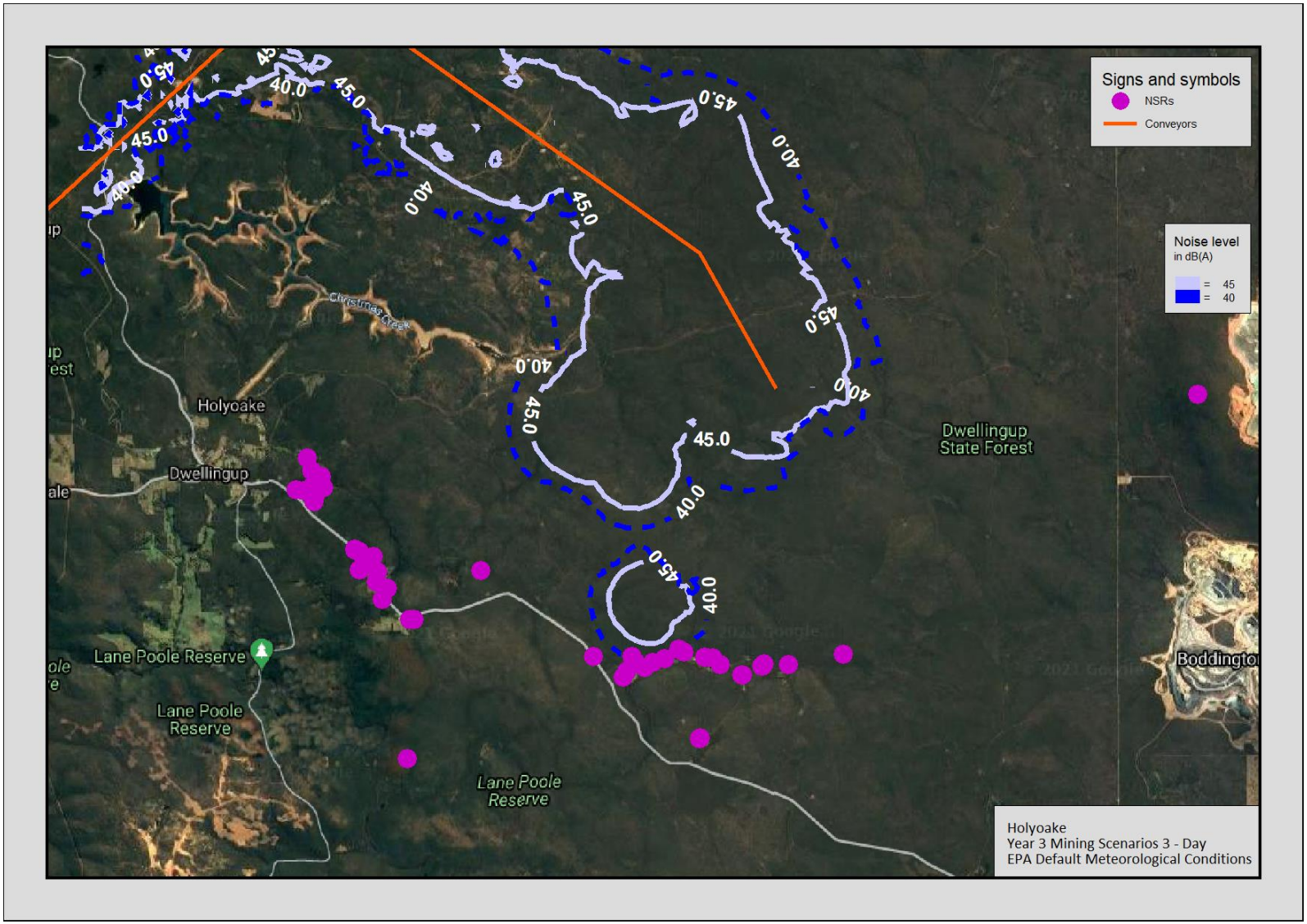
= 30
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Holyoake
Year 2 Mining Scenarios 2 - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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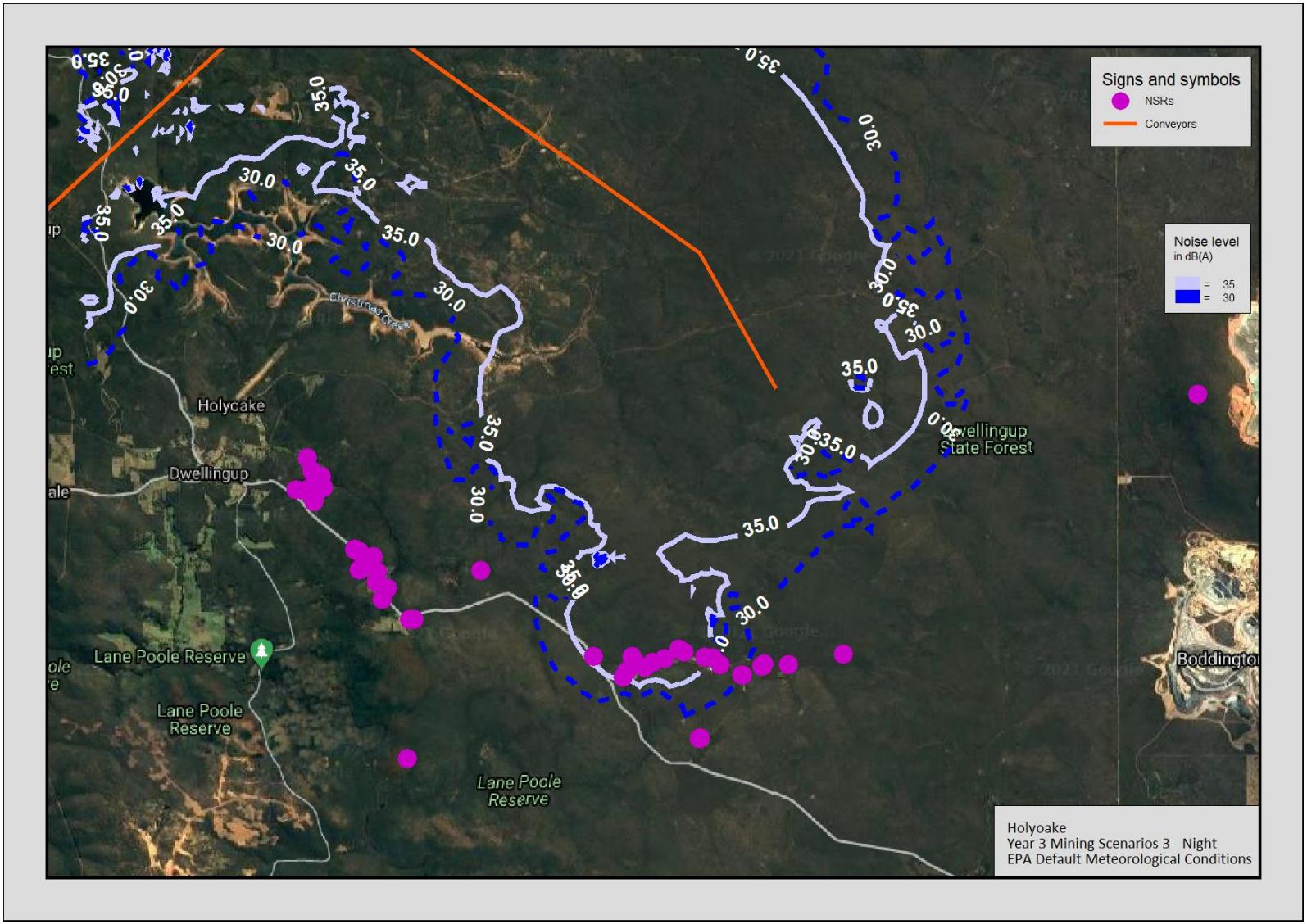
= 40
45.0
40.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake
Year 3 Mining Scenarios 3 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
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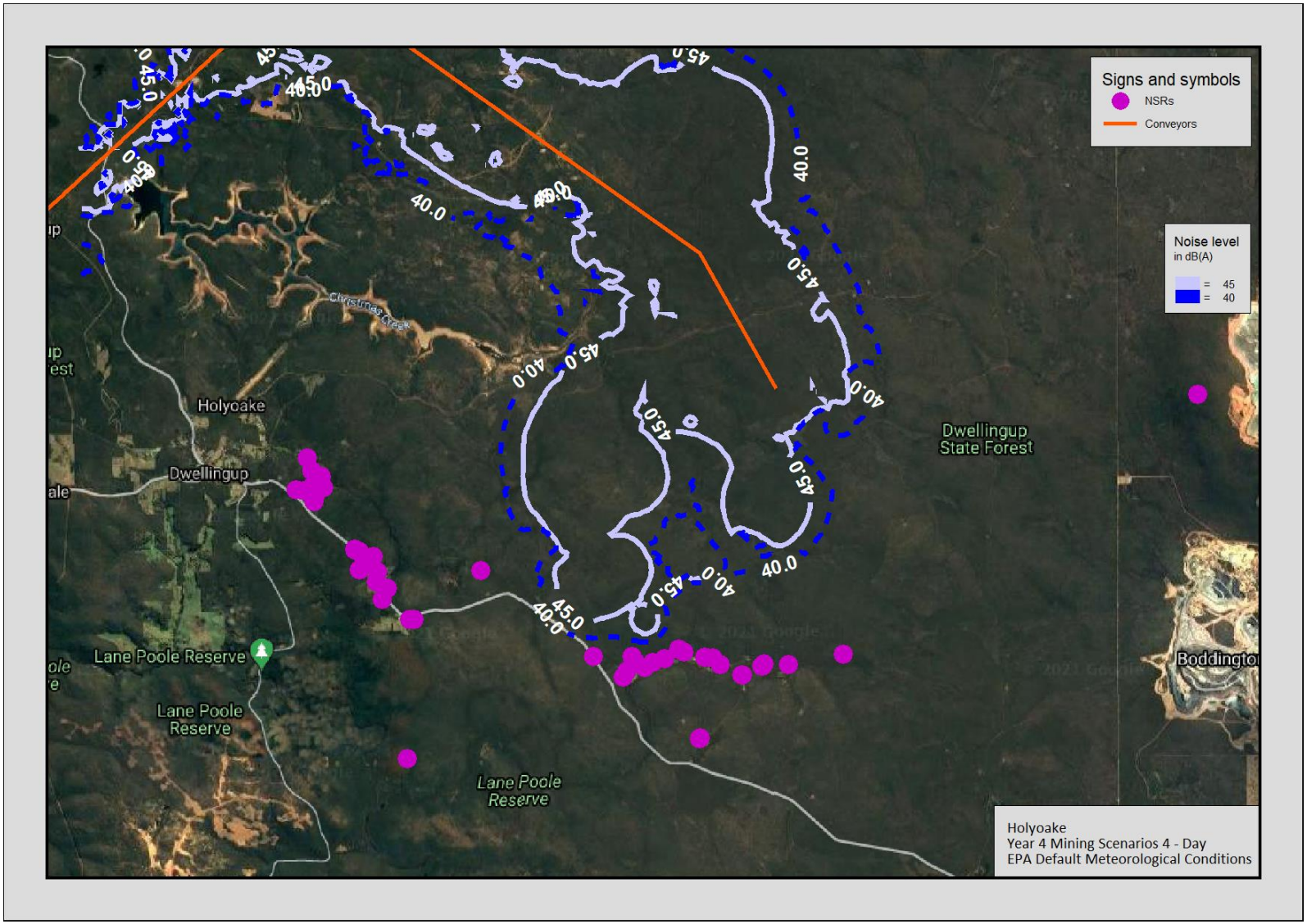
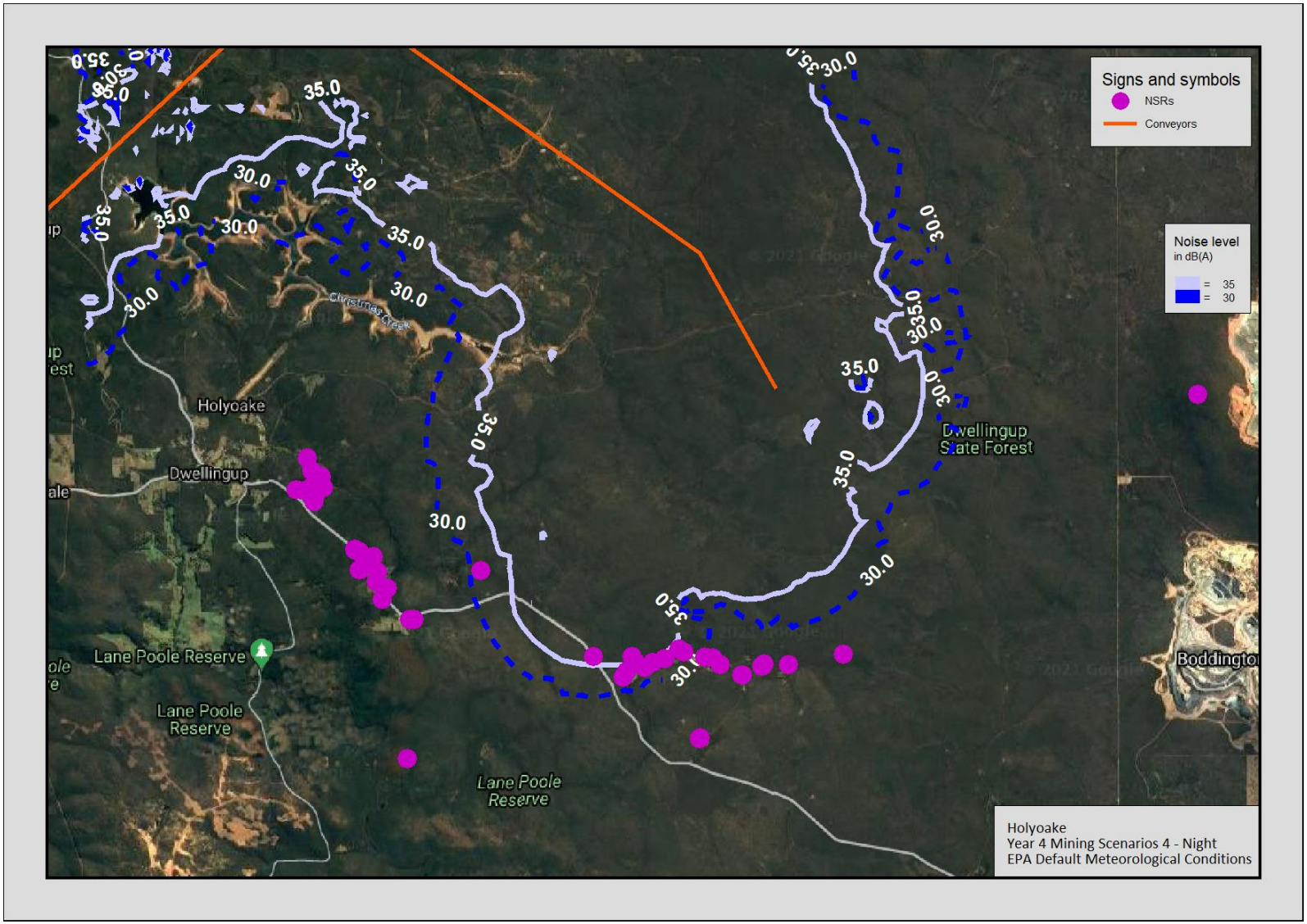
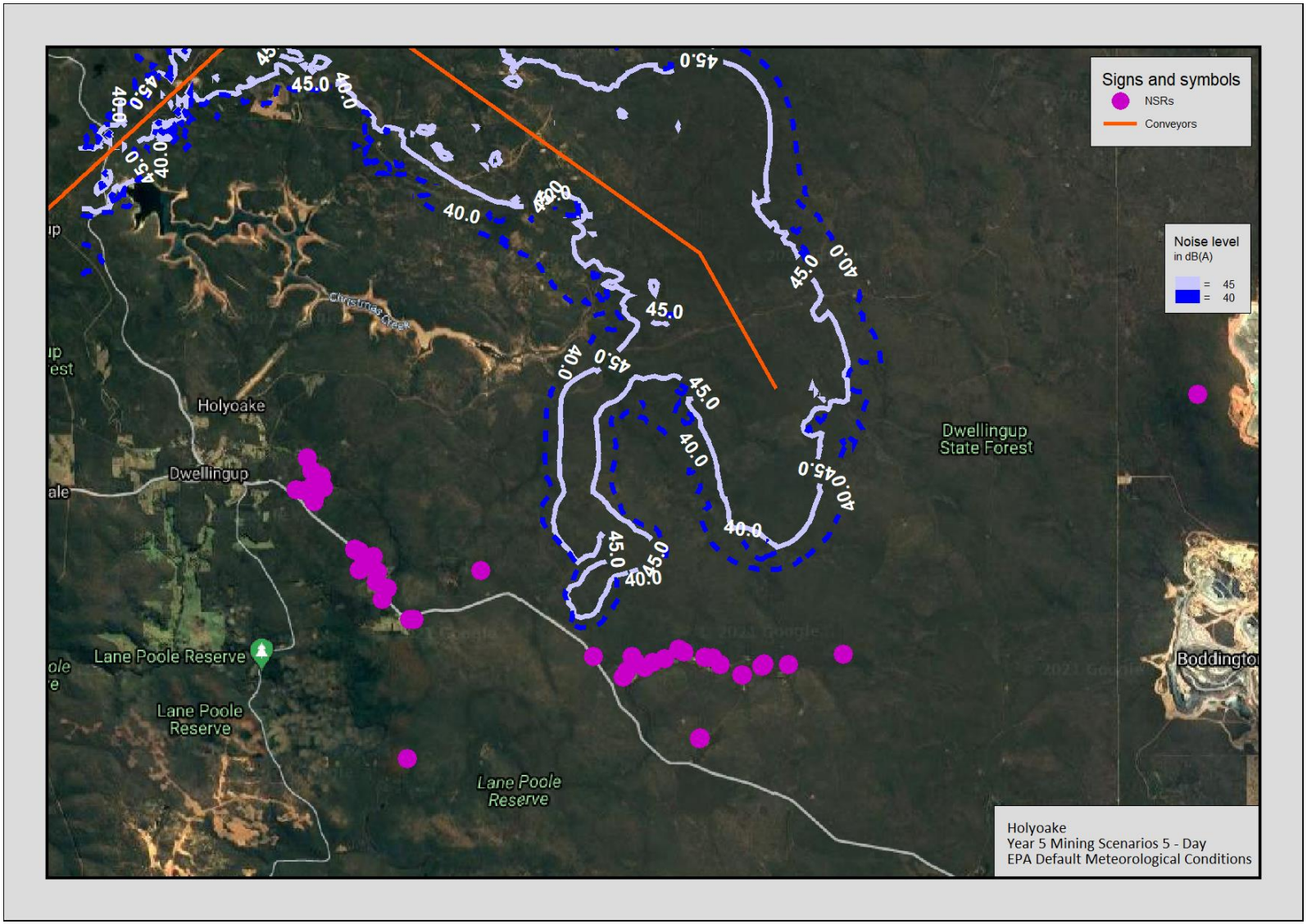
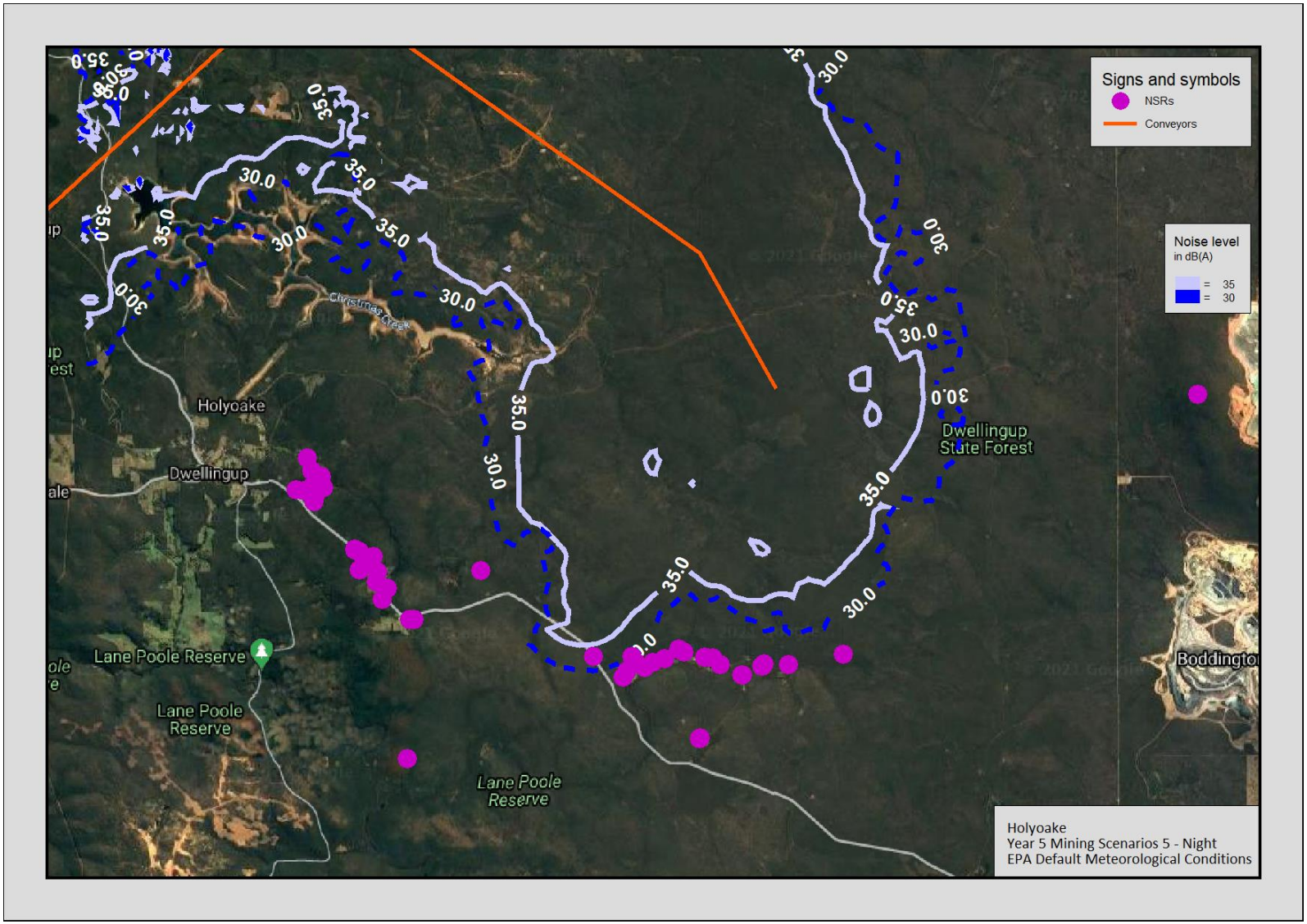
= 30
Holyoake
Dwellingup
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Dwellingup State Forest
Holyoake
Year 3 Mining Scenarios 3 - Night
EPA Default Meteorological Conditions

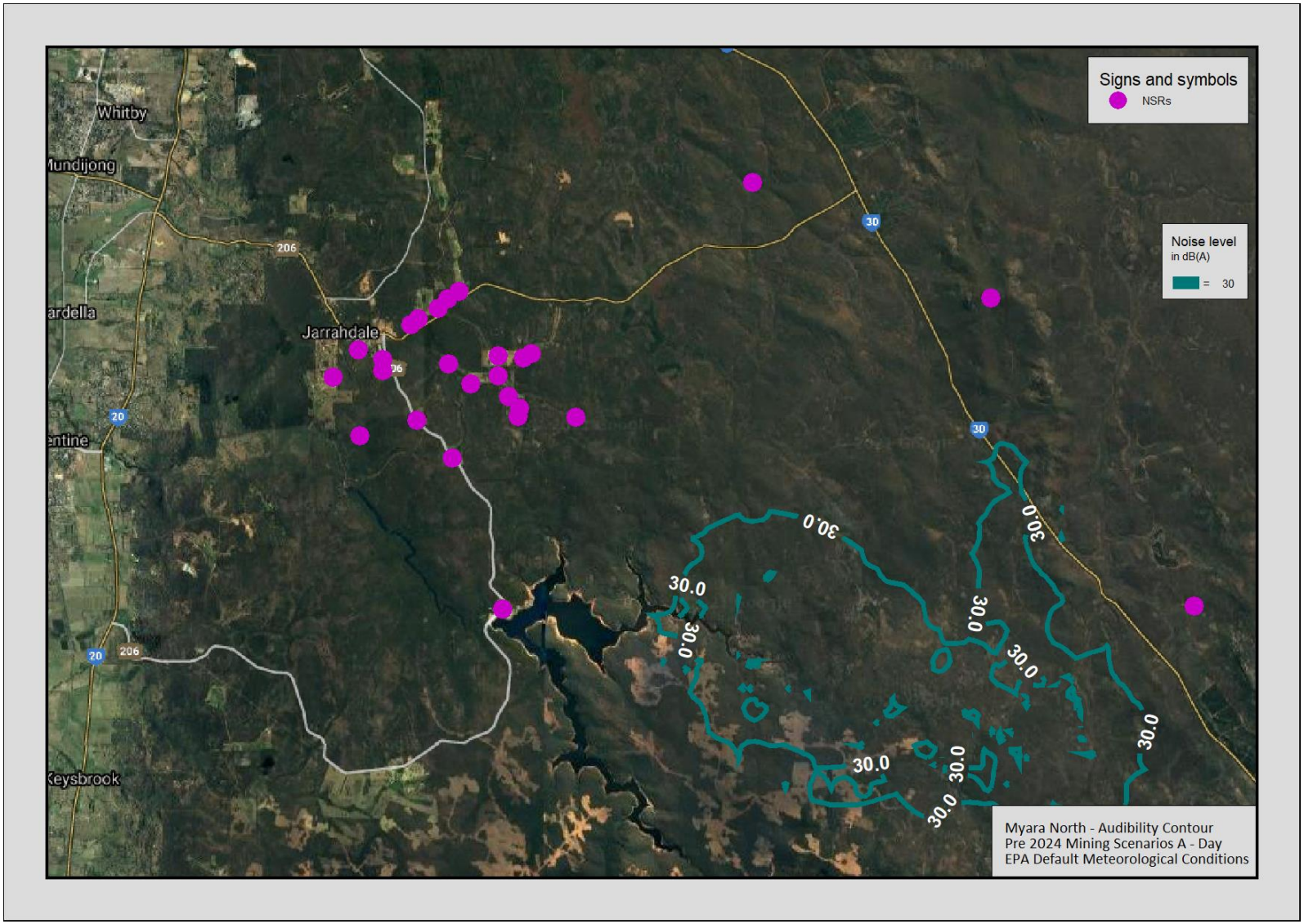

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 45
= 40
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake
Year 4 Mining Scenarios 4 - Day
EPA Default Meteorological Conditions

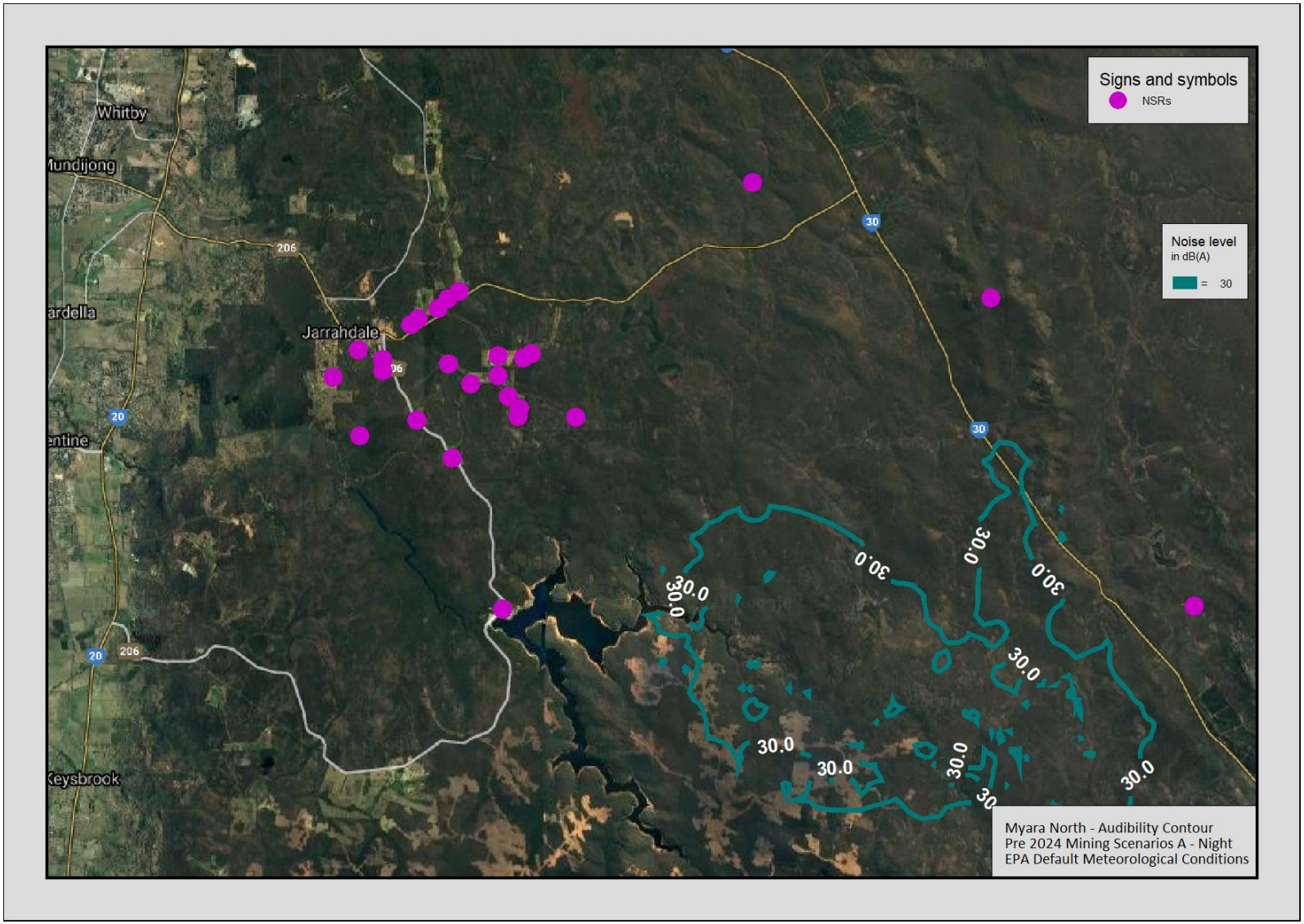

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 35
= 30
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Holyoake
Year 4 Mining Scenarios 4 - Night
EPA Default Meteorological Conditions

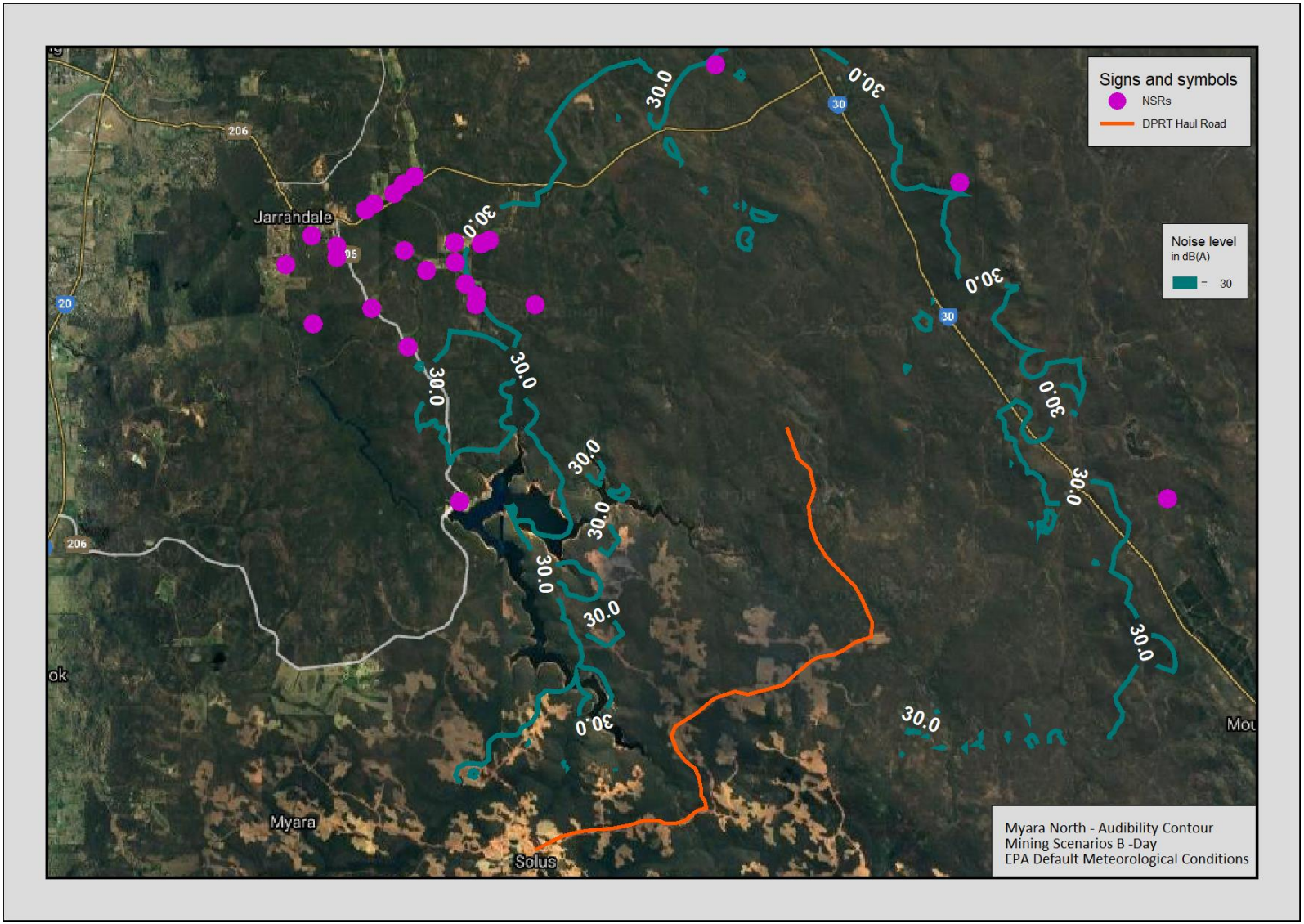

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 45
= 40
45.0
40.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Boddington
Holyoake
Year 5 Mining Scenarios 5 - Day
EPA Default Meteorological Conditions

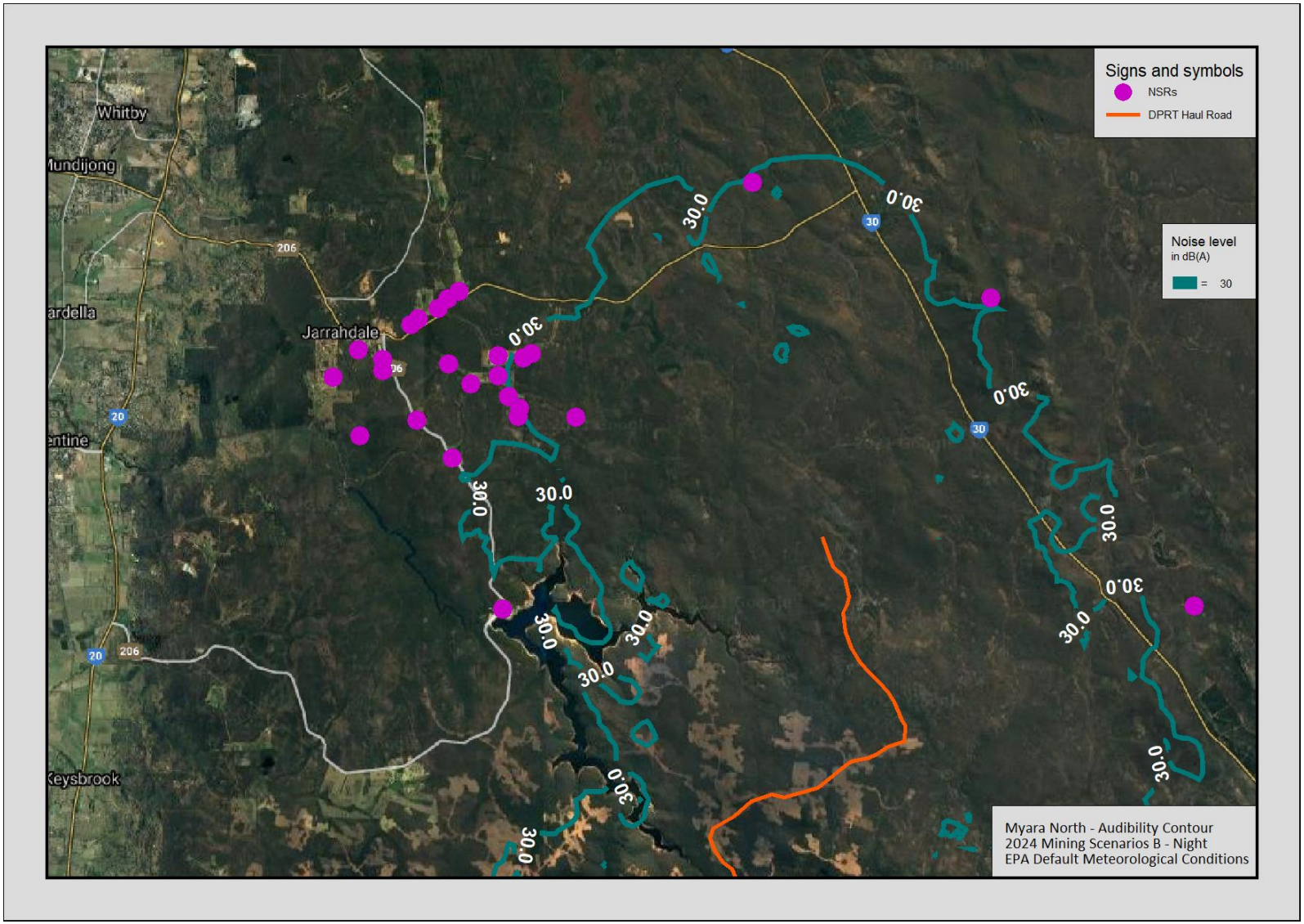

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 35
= 30
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Holyoake
Year 5 Mining Scenarios 5 - Night
EPA Default Meteorological Conditions

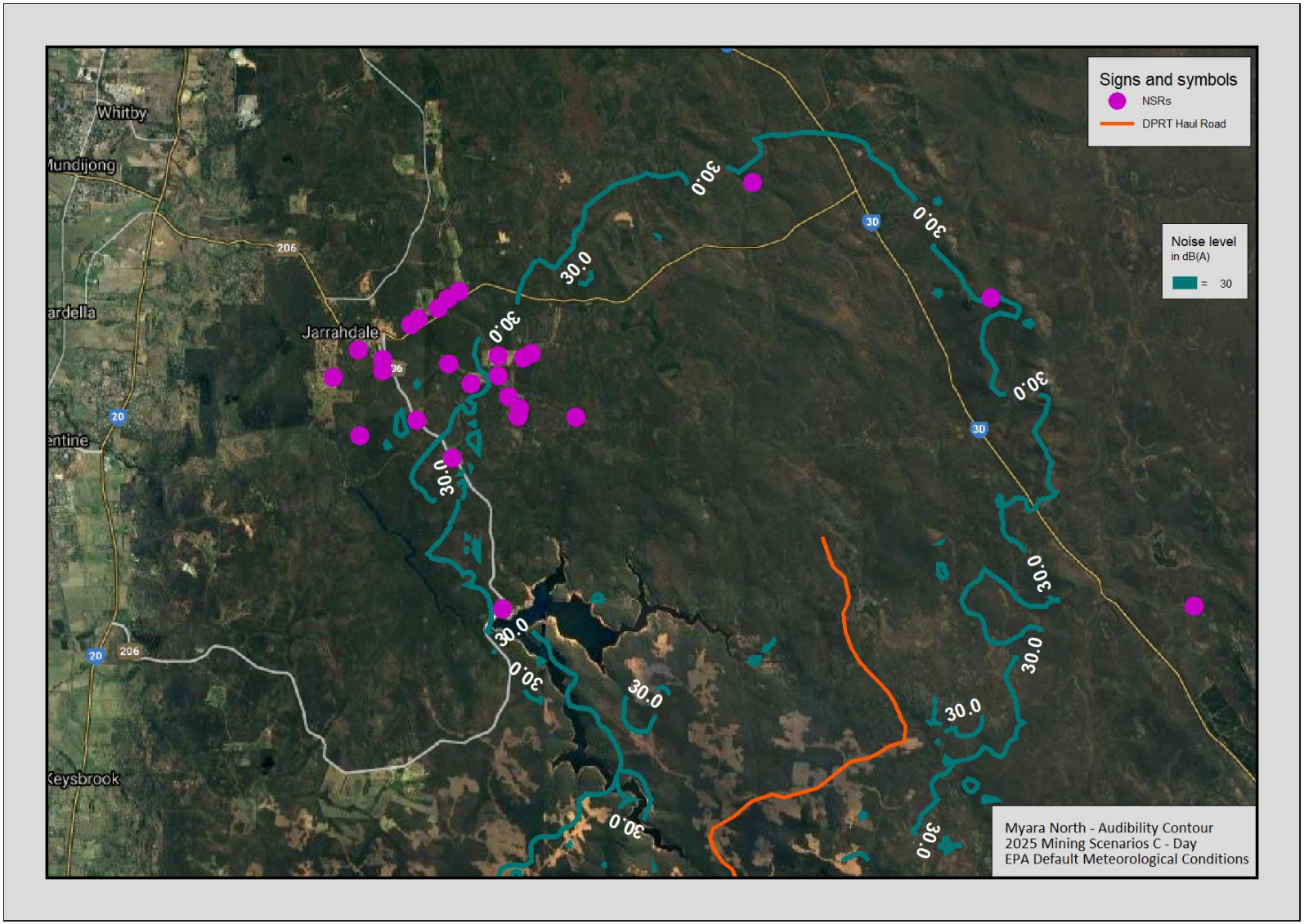
APPENDIX E MYARA NORTH AUDIBILITY CONTOURS

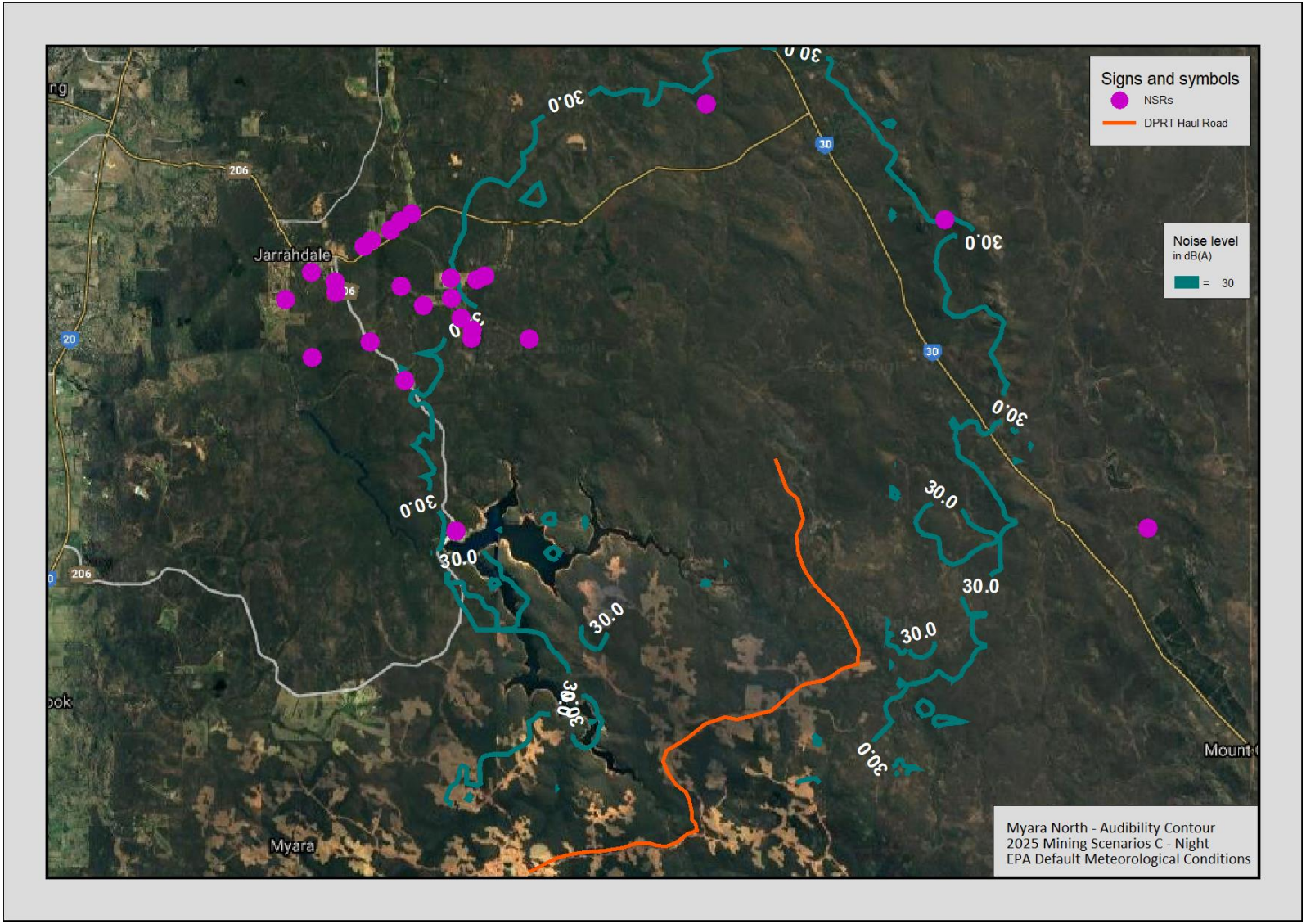

Signs and symbols
NSRs
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
Pre 2024 Mining Scenarios A - Day
EPA Default Meteorological Conditions

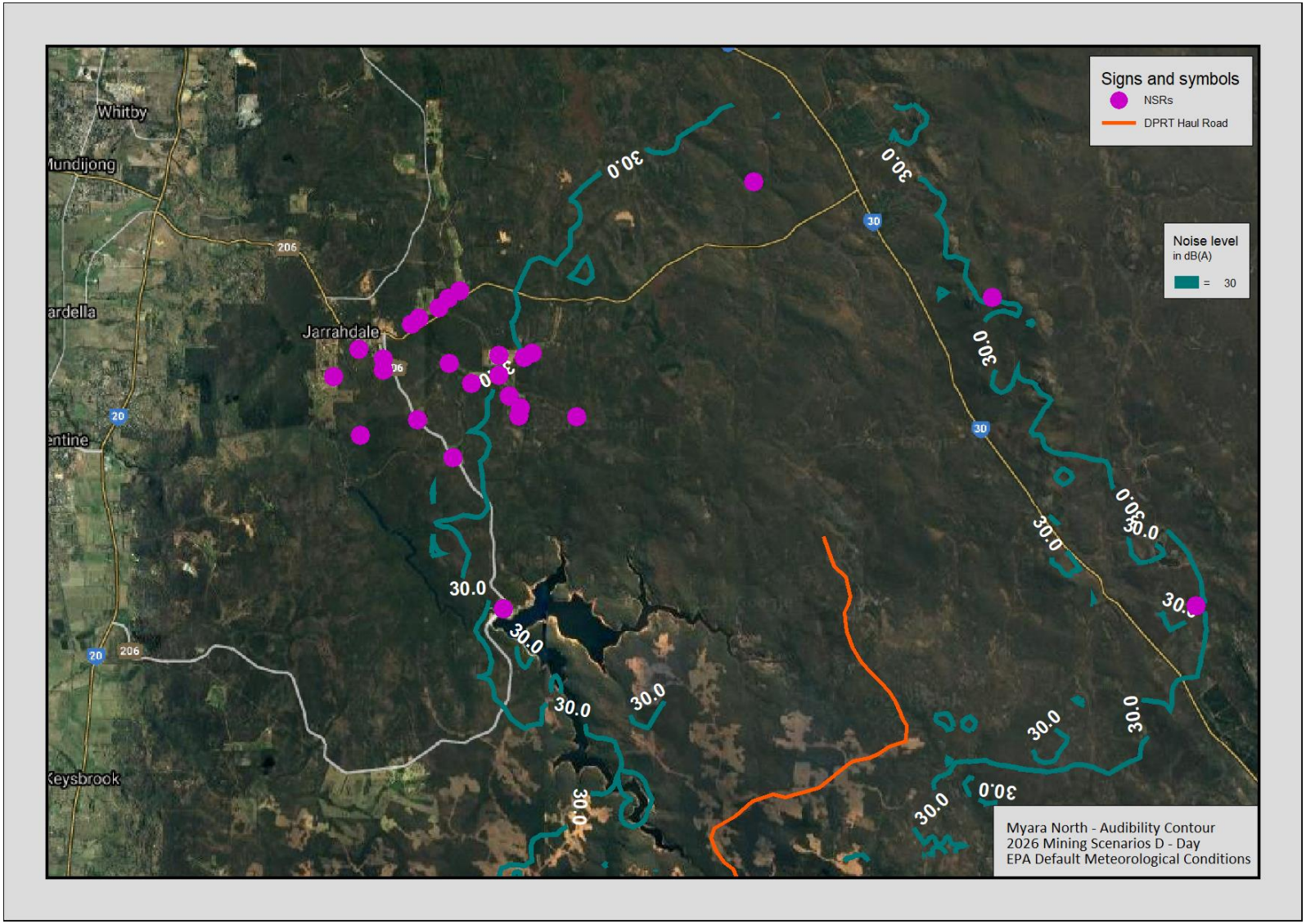

Signs and symbols
NSRs
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
Pre 2024 Mining Scenarios A - Night
EPA Default Meteorological Conditions

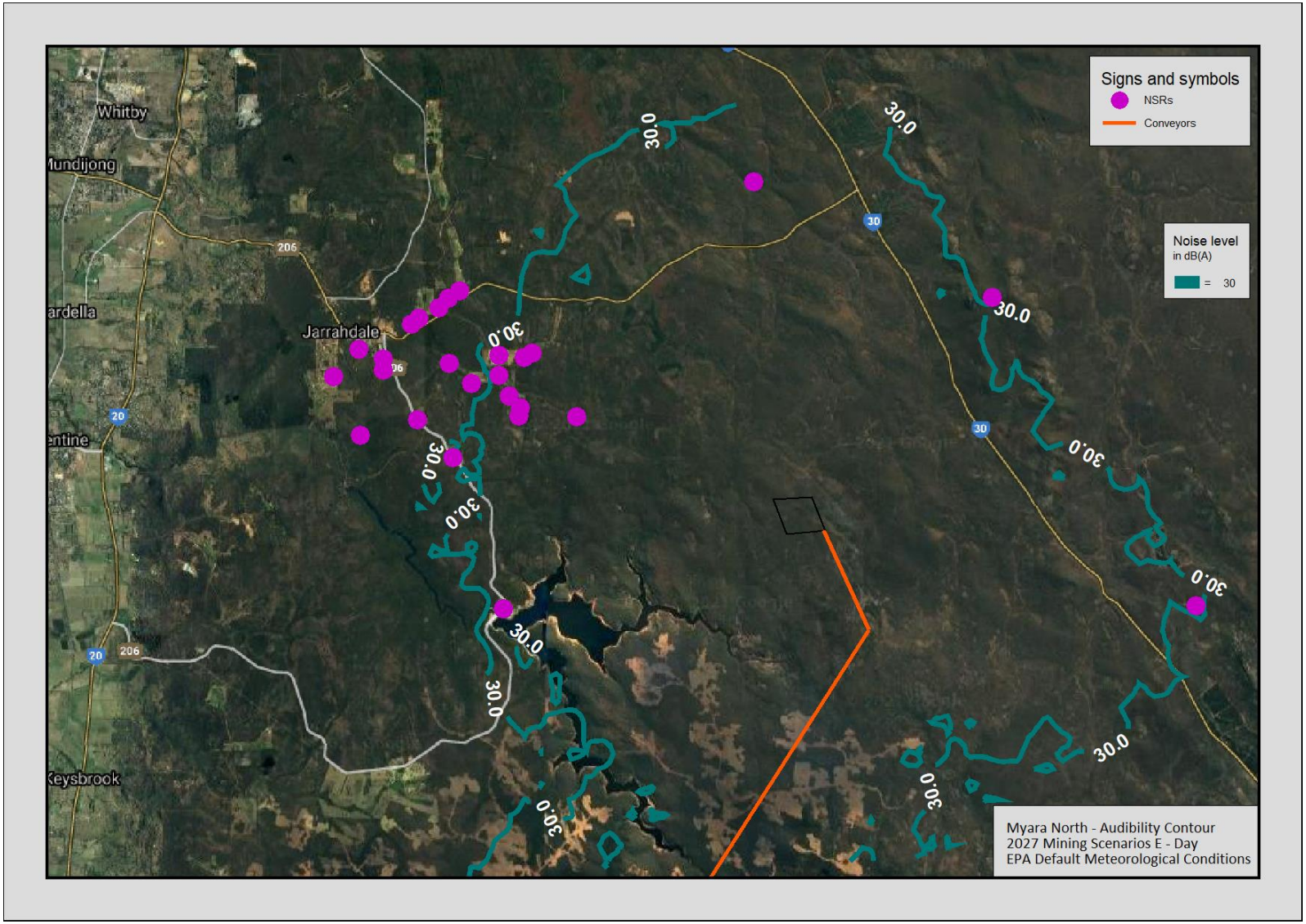

Signs and symbols
NSRs
DPRT Haul Road
Noise level
in dB(A)
= 30
Jarrahdale
Myara
Solus
206
20
30
30.0
Myara North - Audibility Contour
Mining Scenarios B -Day
EPA Default Meteorological Conditions

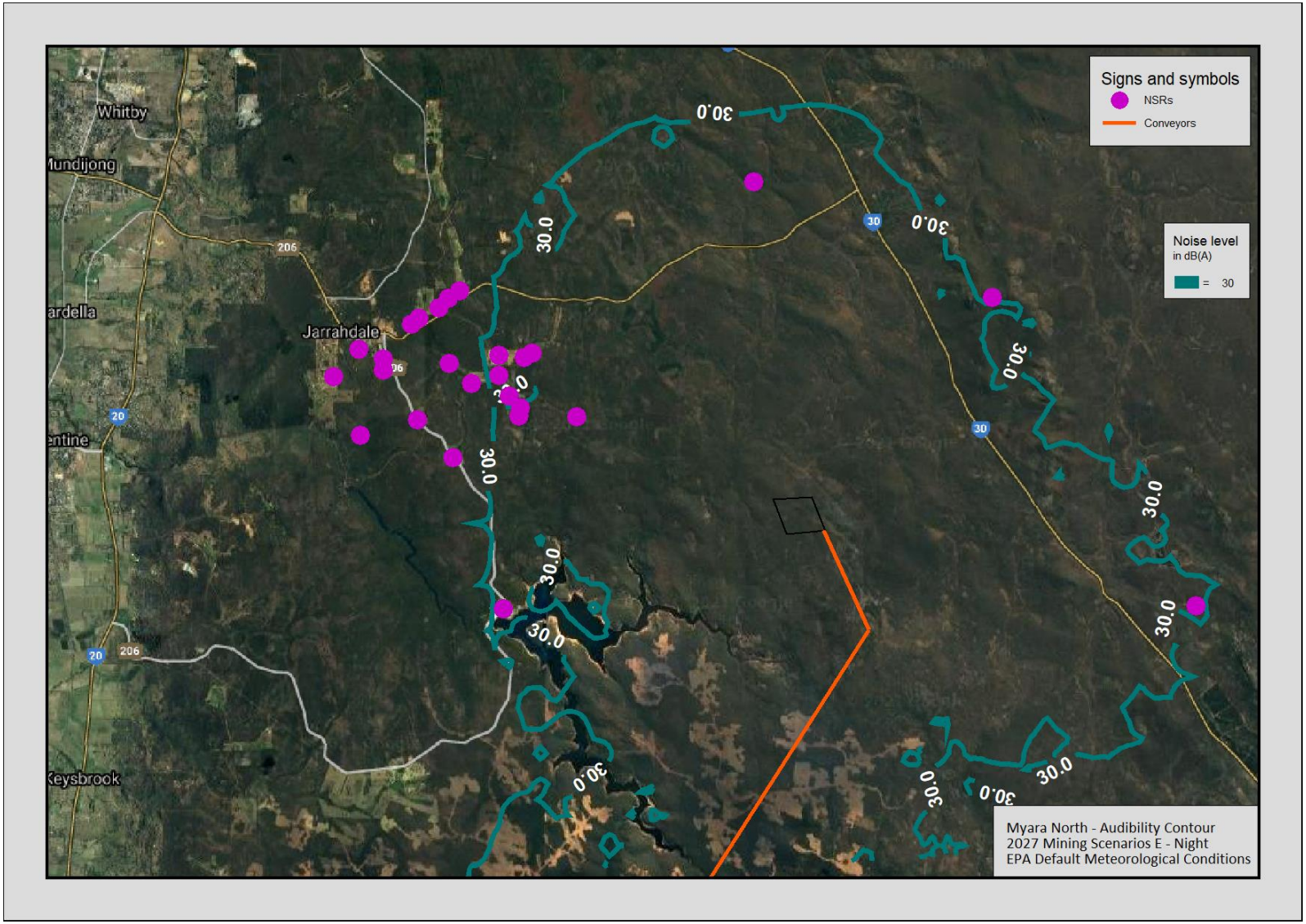

Signs and symbols
NSRs
DPRT Haul Road
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2024 Mining Scenarios B - Night
EPA Default Meteorological Conditions

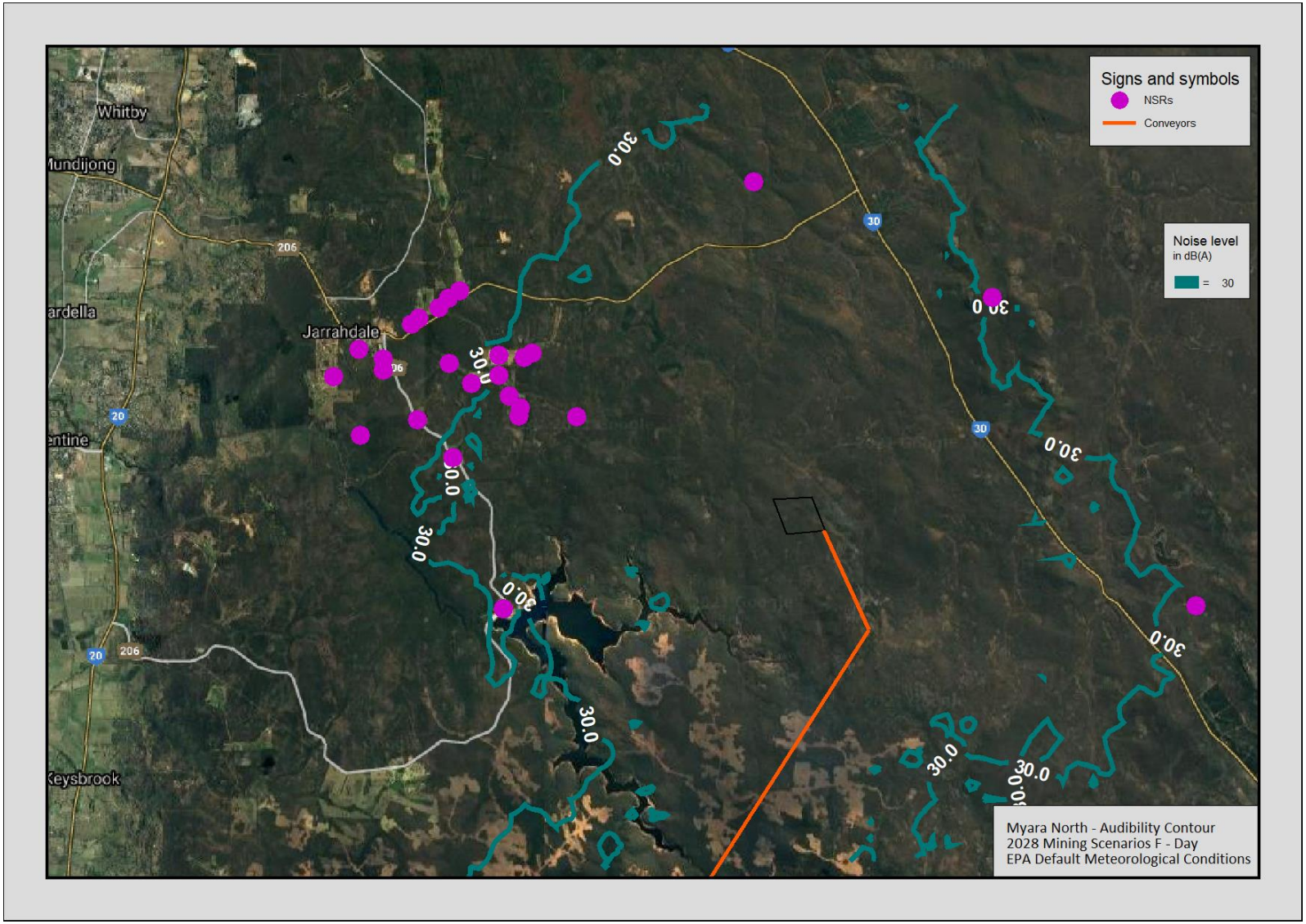

Signs and symbols
NSRs
DPRT Haul Road
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
30
20
30.0
Myara North - Audibility Contour
2025 Mining Scenarios C - Day
EPA Default Meteorological Conditions

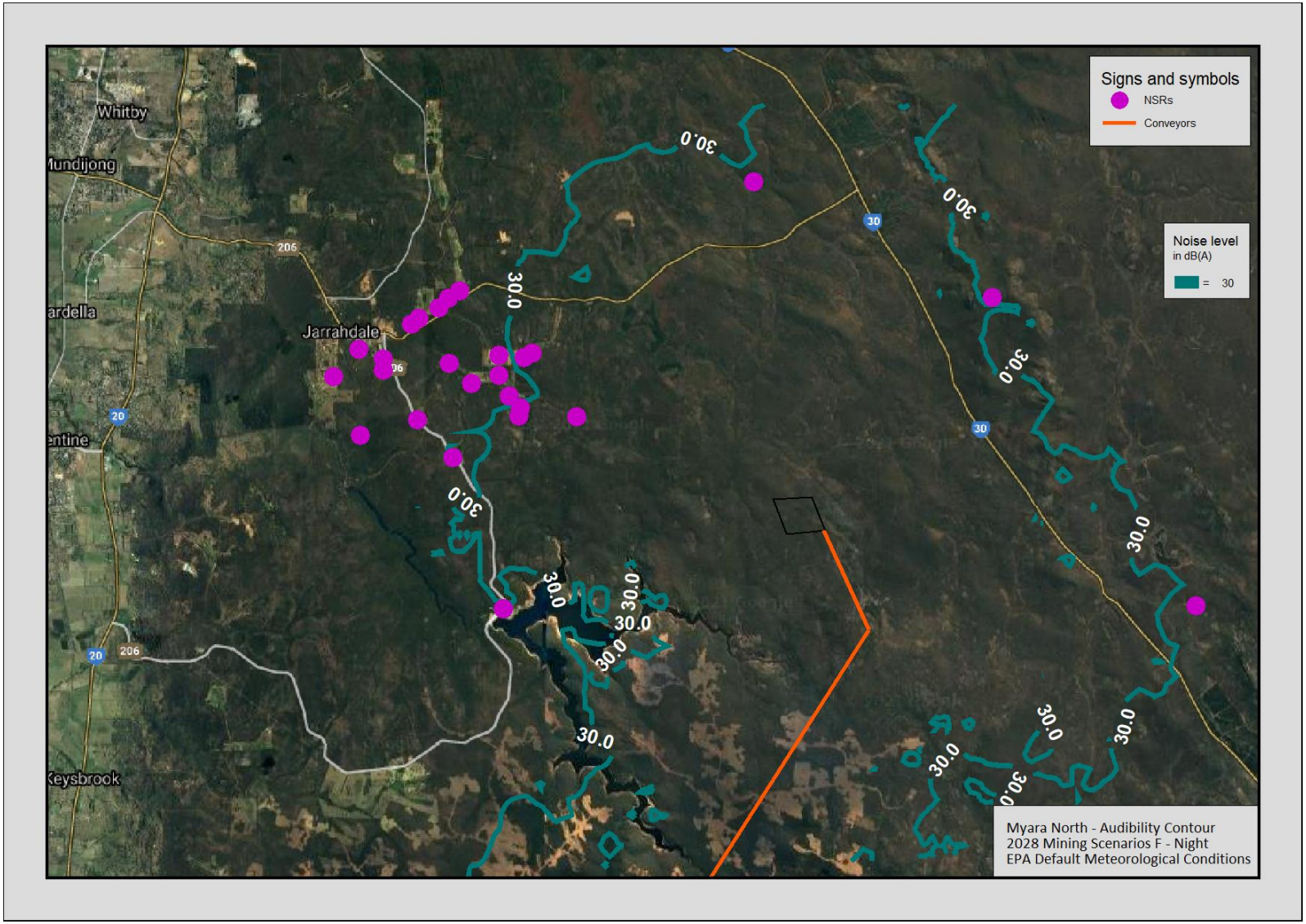

Signs and symbols
NSRs
DPRT Haul Road
Noise level
in dB(A)
= 30
Jarrahdale
Myara
Mount
30.0
Myara North - Audibility Contour
2025 Mining Scenarios C - Night
EPA Default Meteorological Conditions

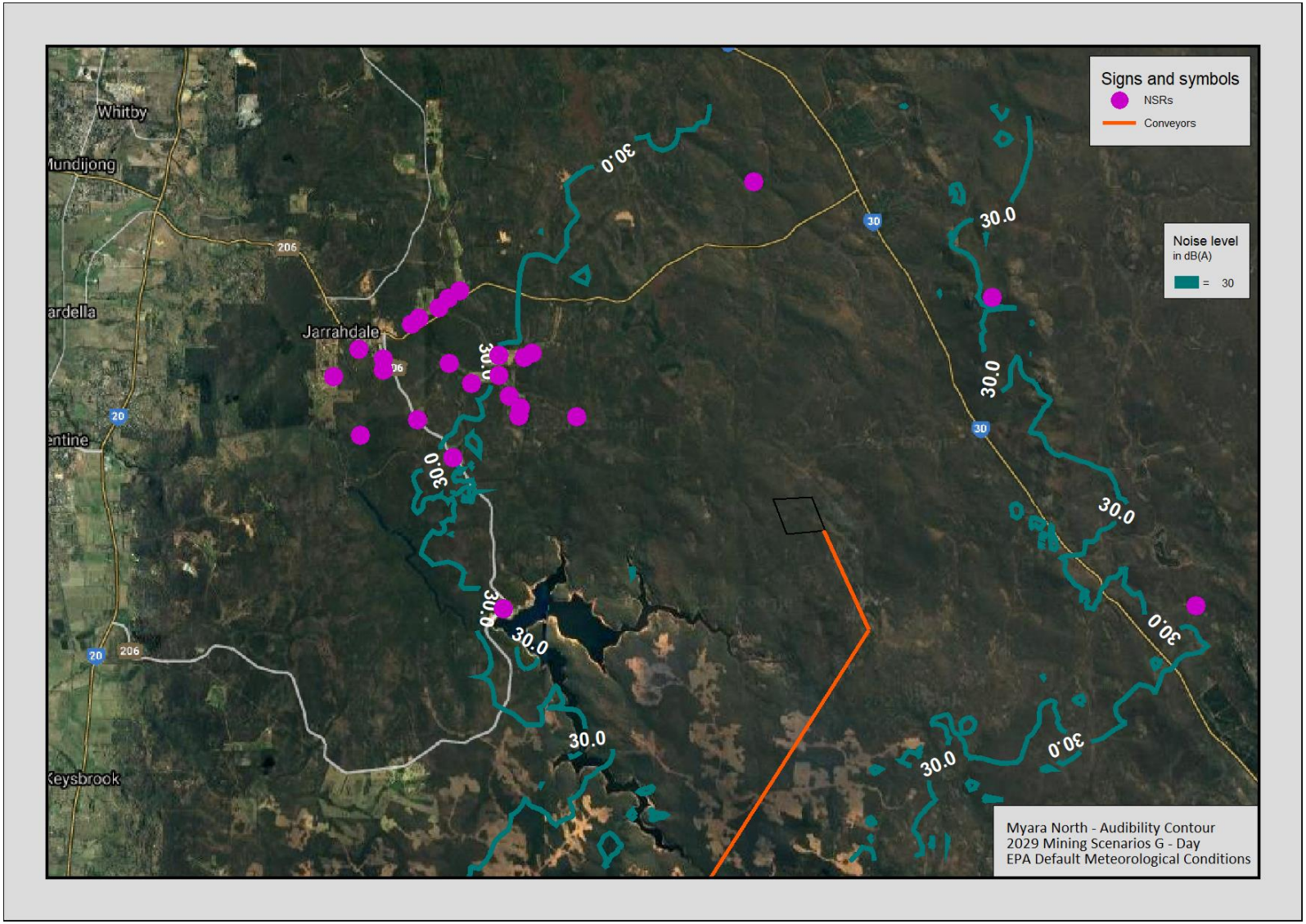

Signs and symbols
NSRs
DPRT Haul Road
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2026 Mining Scenarios D - Day
EPA Default Meteorological Conditions

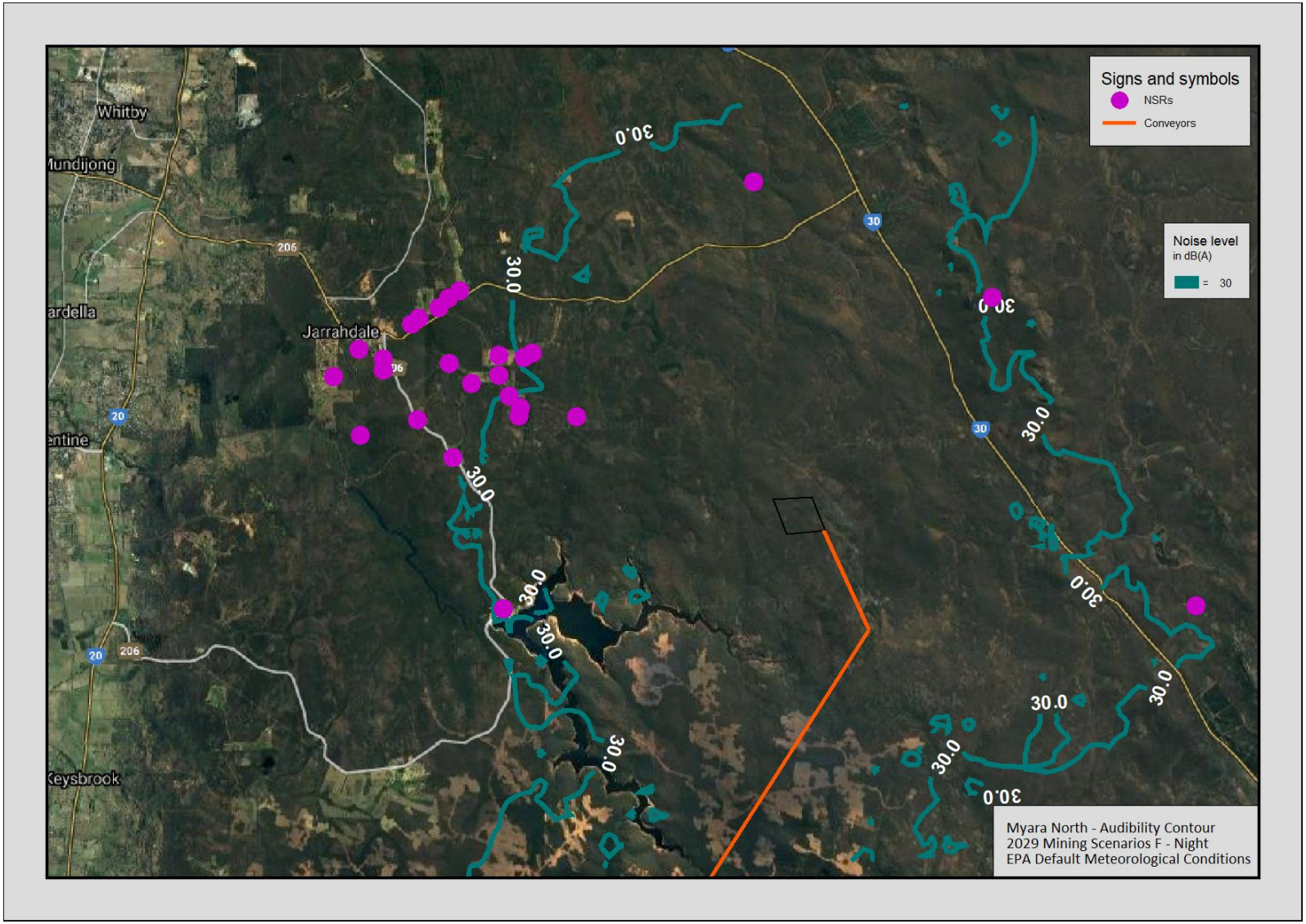

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
30.0
Myara North - Audibility Contour
2027 Mining Scenarios E - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2027 Mining Scenarios E - Night
EPA Default Meteorological Conditions

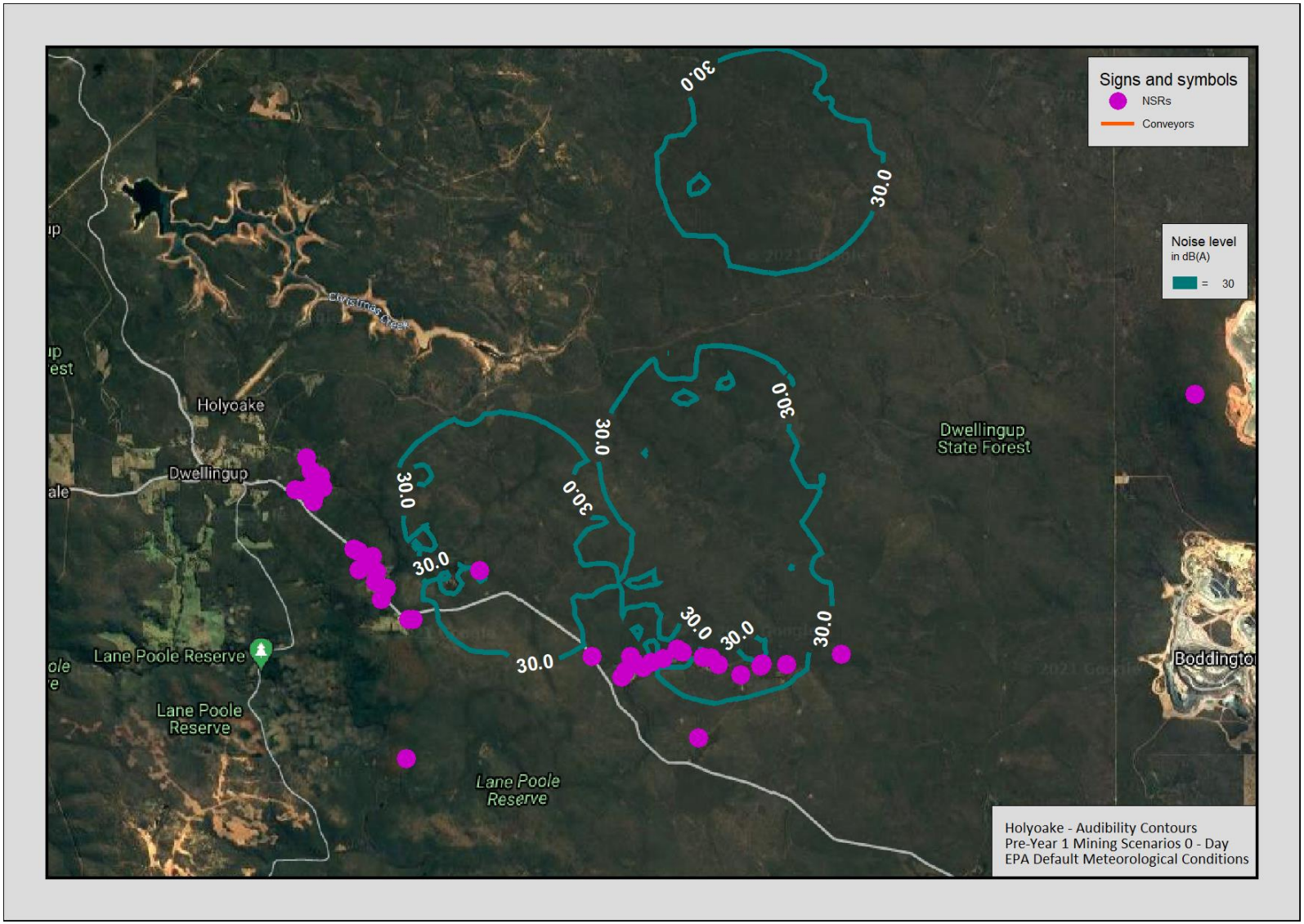

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2028 Mining Scenarios F - Day
EPA Default Meteorological Conditions

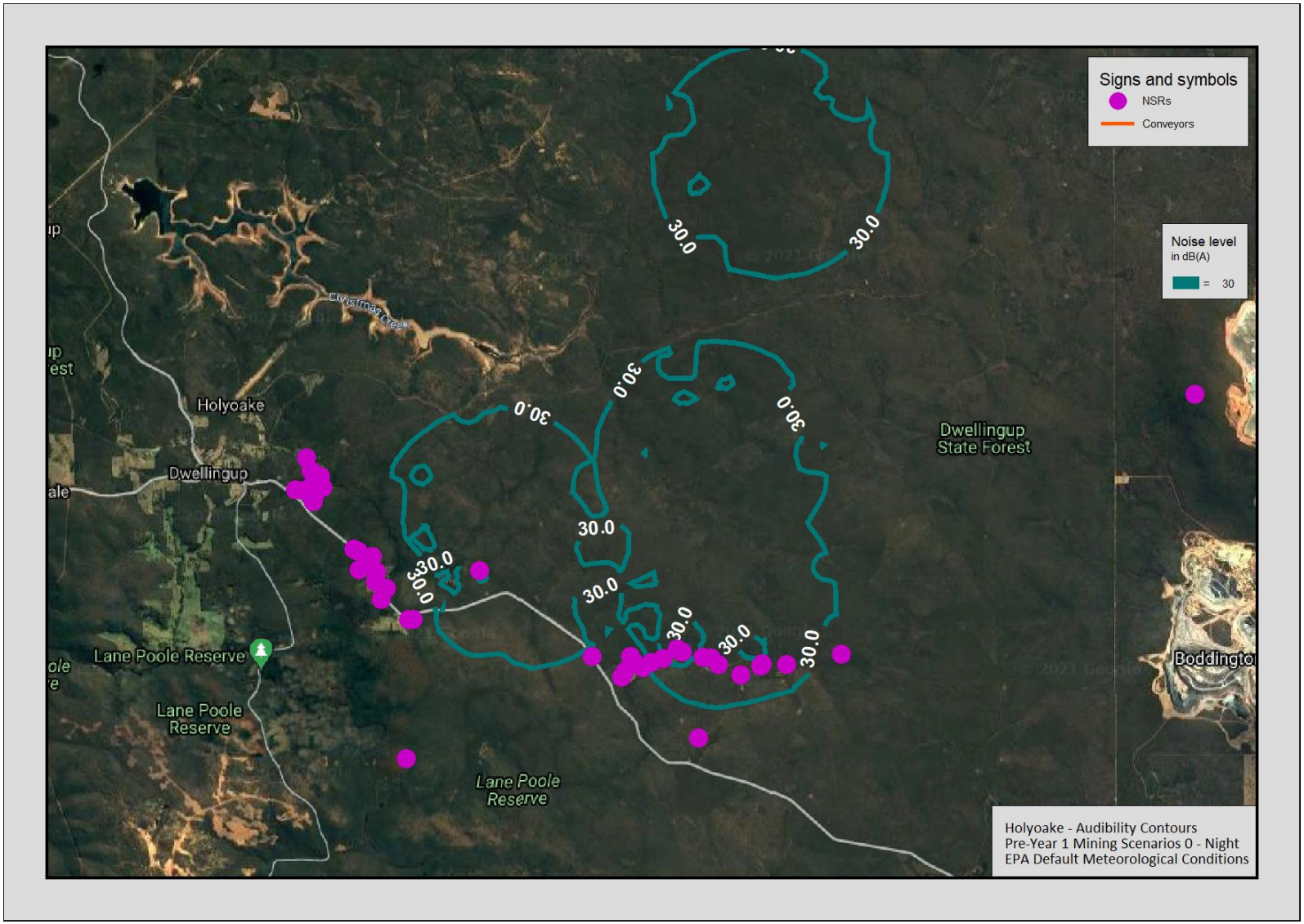

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2028 Mining Scenarios F - Night
EPA Default Meteorological Conditions

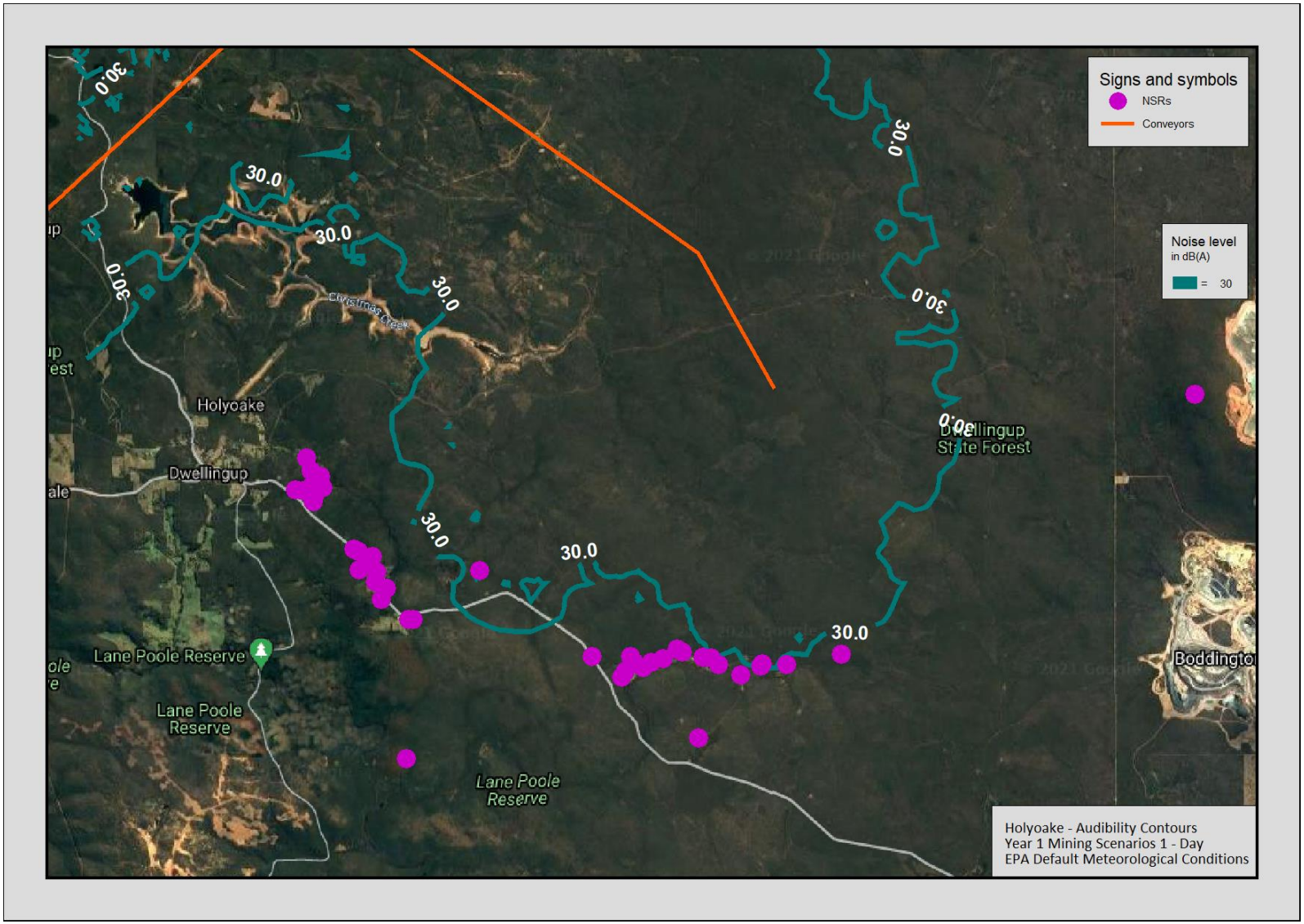

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2029 Mining Scenarios G - Day
EPA Default Meteorological Conditions

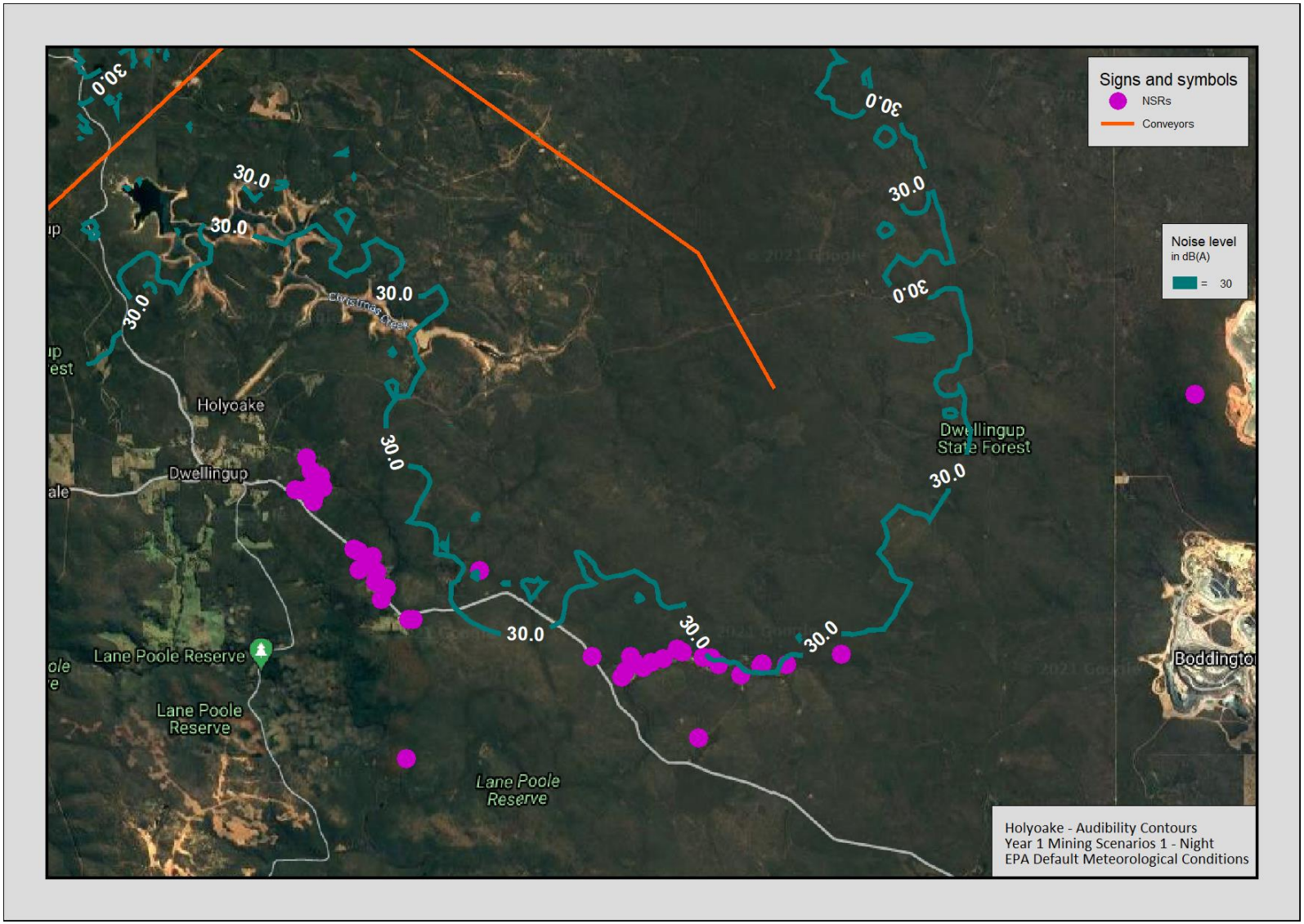

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
Whitby
Jarrahdale
Keysbrook
206
20
30
30.0
Myara North - Audibility Contour
2029 Mining Scenarios F - Night
EPA Default Meteorological Conditions

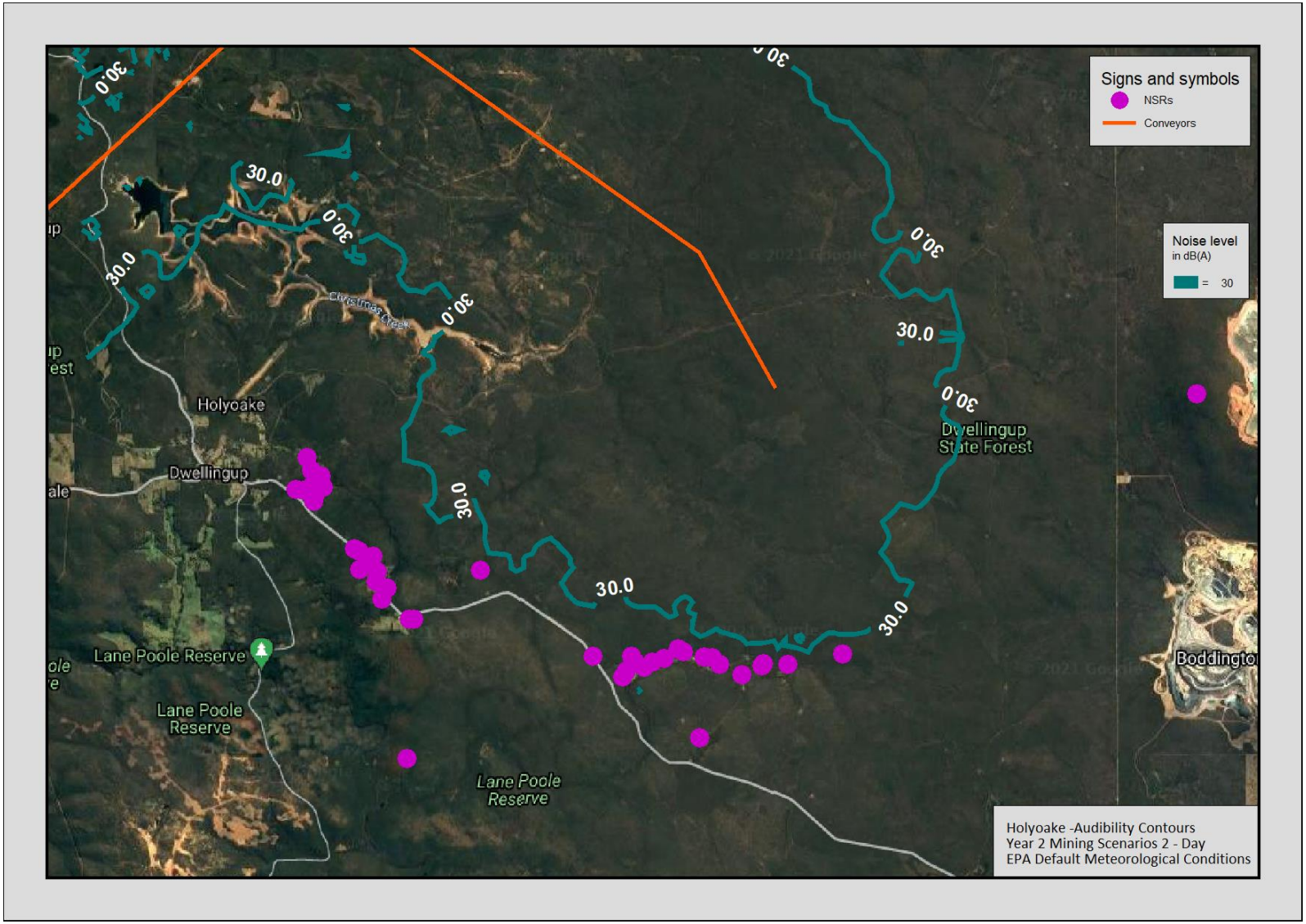
APPENDIX F HOLYOAKE AUDIBILITY CONTOURS

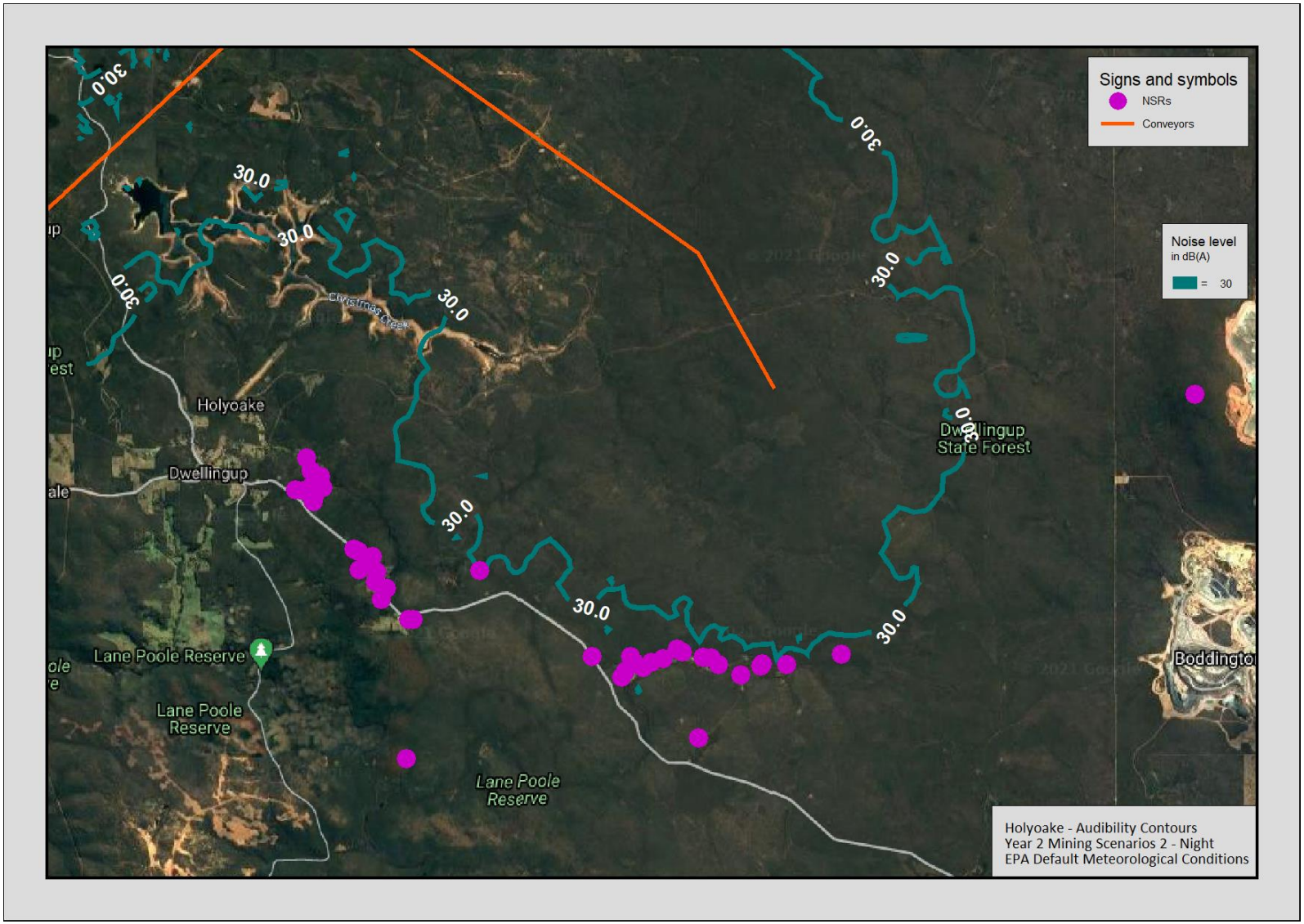

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Boddington
Holyoake - Audibility Contours
Pre-Year 1 Mining Scenarios 0 - Day
EPA Default Meteorological Conditions

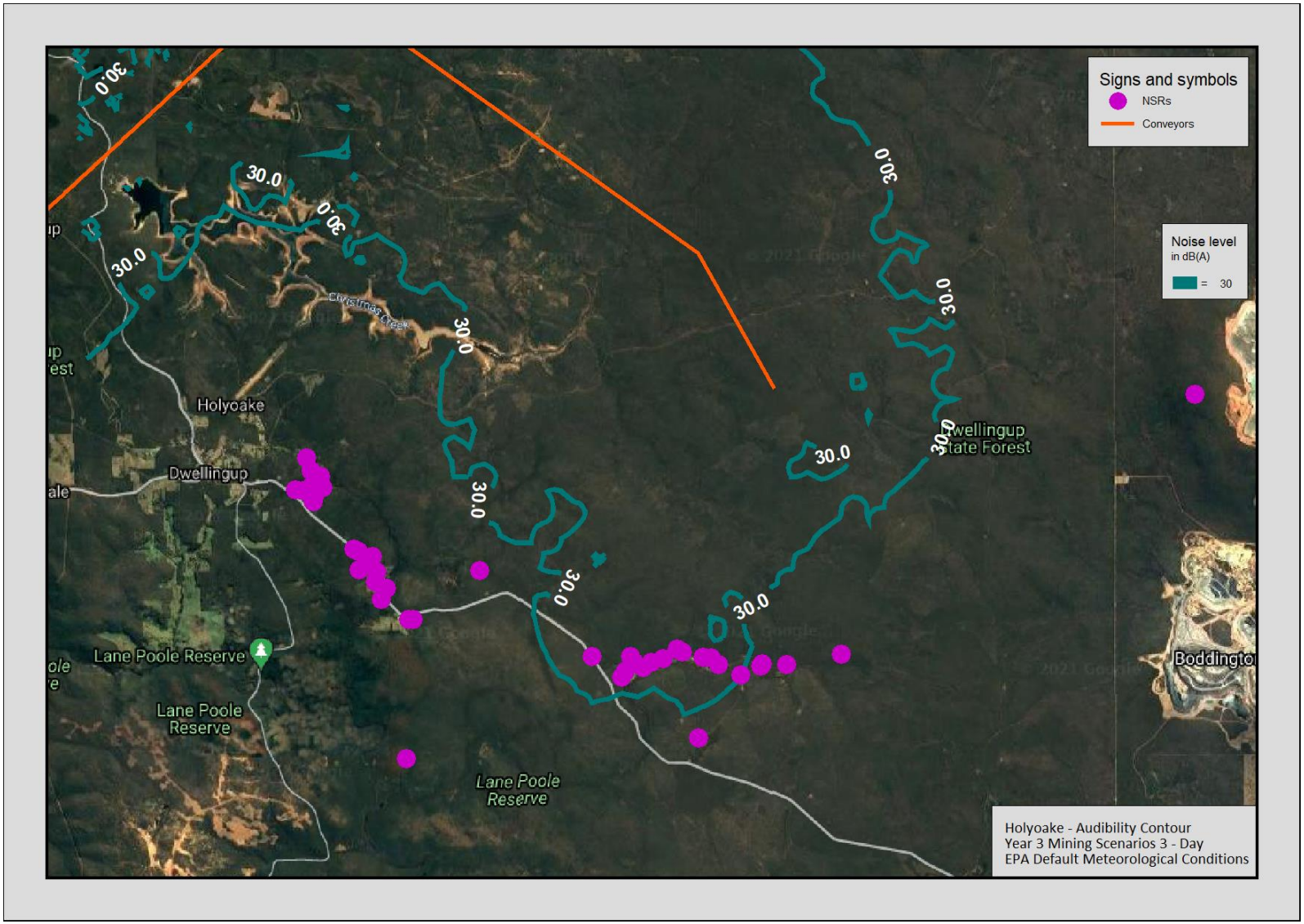

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Boddington
Holyoake - Audibility Contours
Pre-Year 1 Mining Scenarios 0 - Night
EPA Default Meteorological Conditions

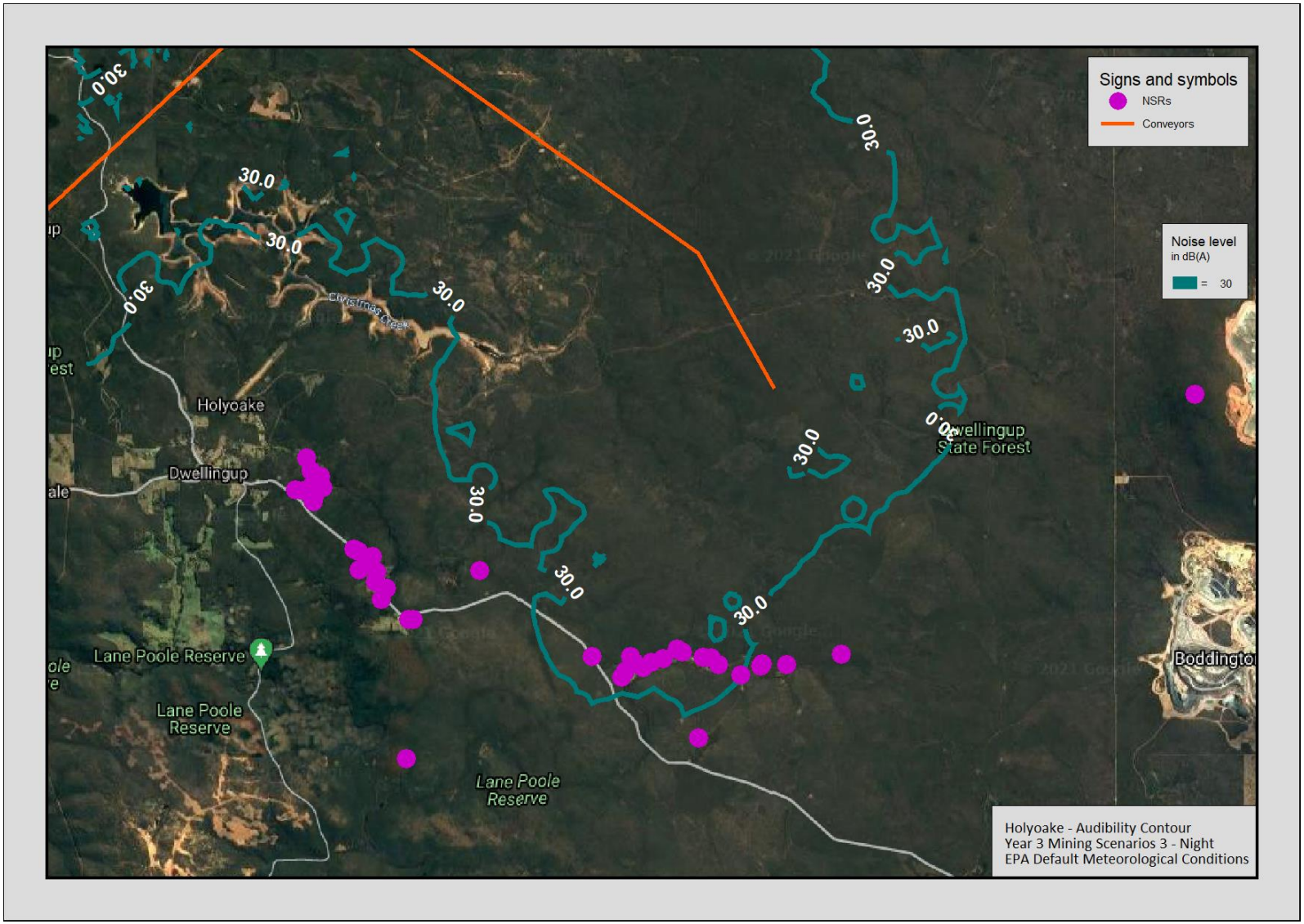

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Holyoake - Audibility Contours
Year 1 Mining Scenarios 1 - Day
EPA Default Meteorological Conditions

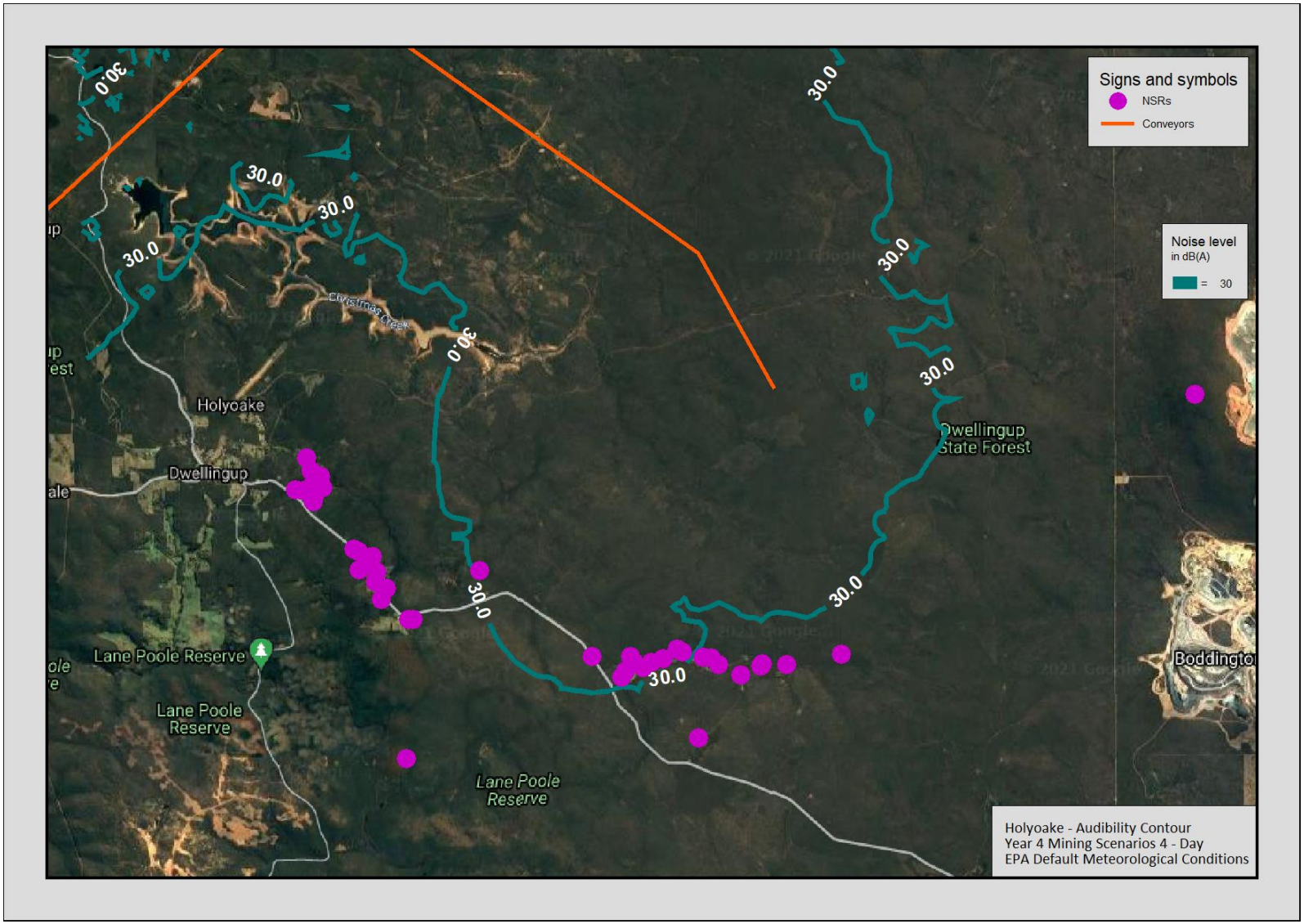

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Boddington
Holyoake - Audibility Contours
Year 1 Mining Scenarios 1 - Night
EPA Default Meteorological Conditions

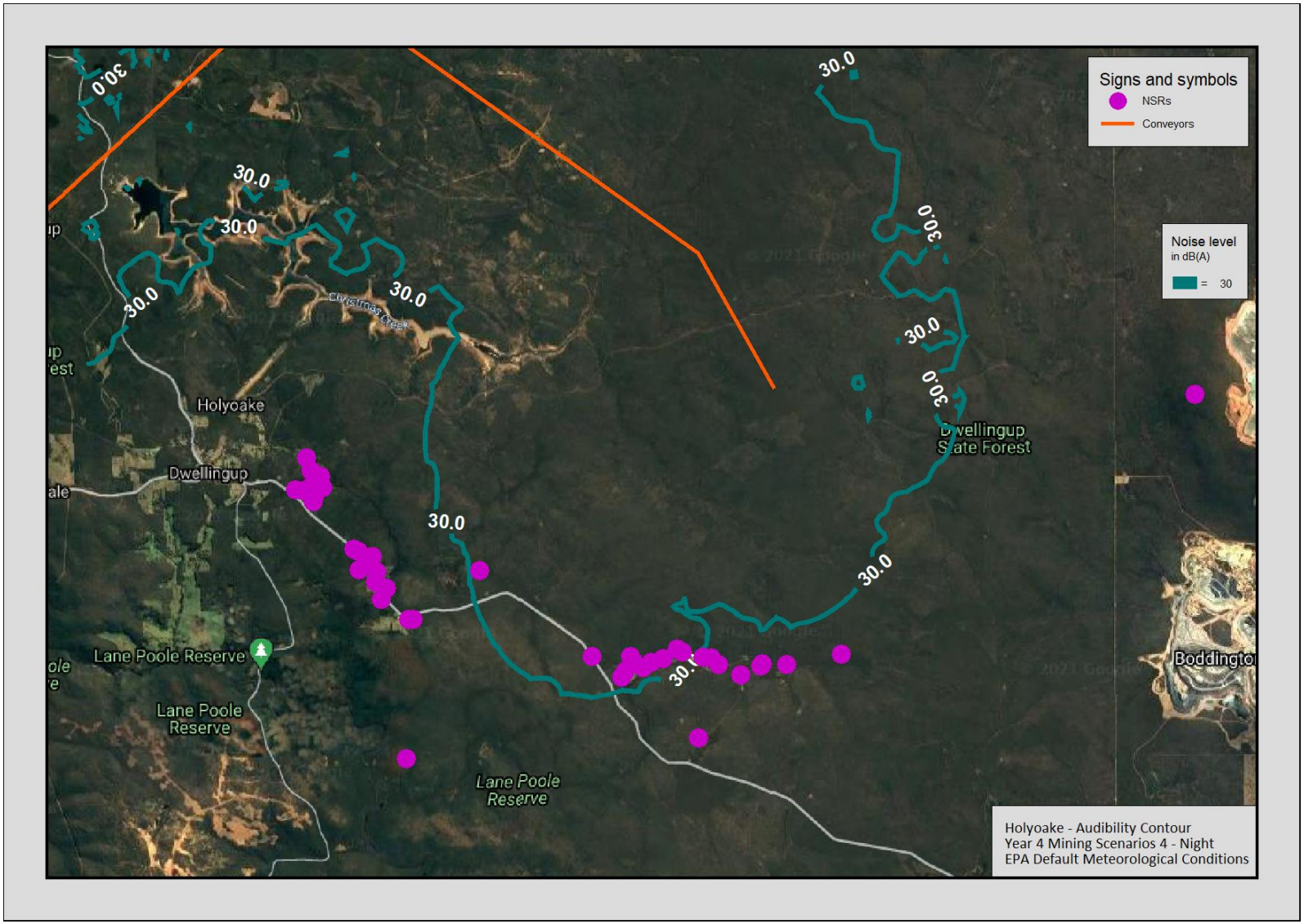

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Boddington
Holyoake -Audibility Contours
Year 2 Mining Scenarios 2 - Day
EPA Default Meteorological Conditions

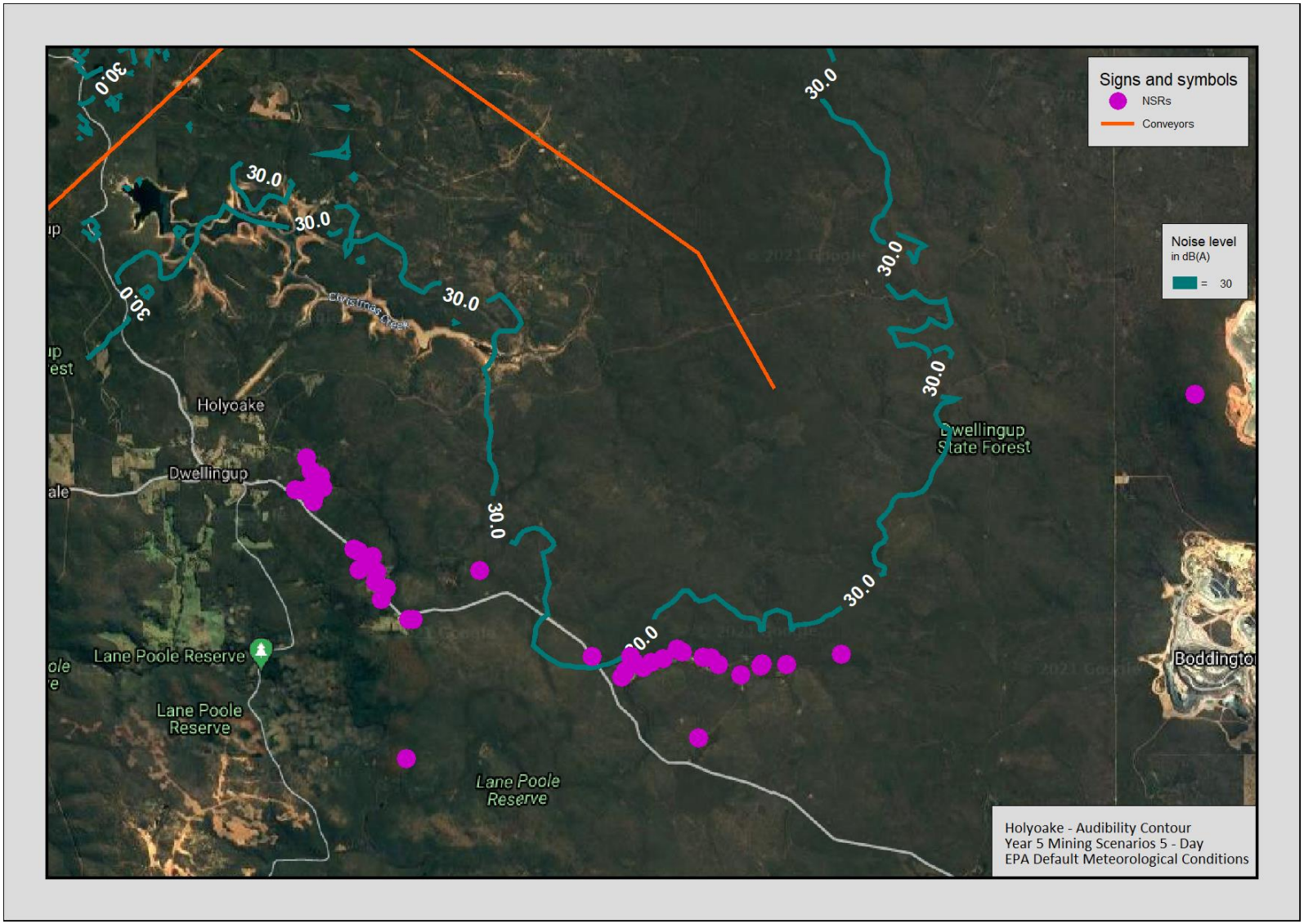

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Boddington
Holyoake - Audibility Contours
Year 2 Mining Scenarios 2 - Night
EPA Default Meteorological Conditions

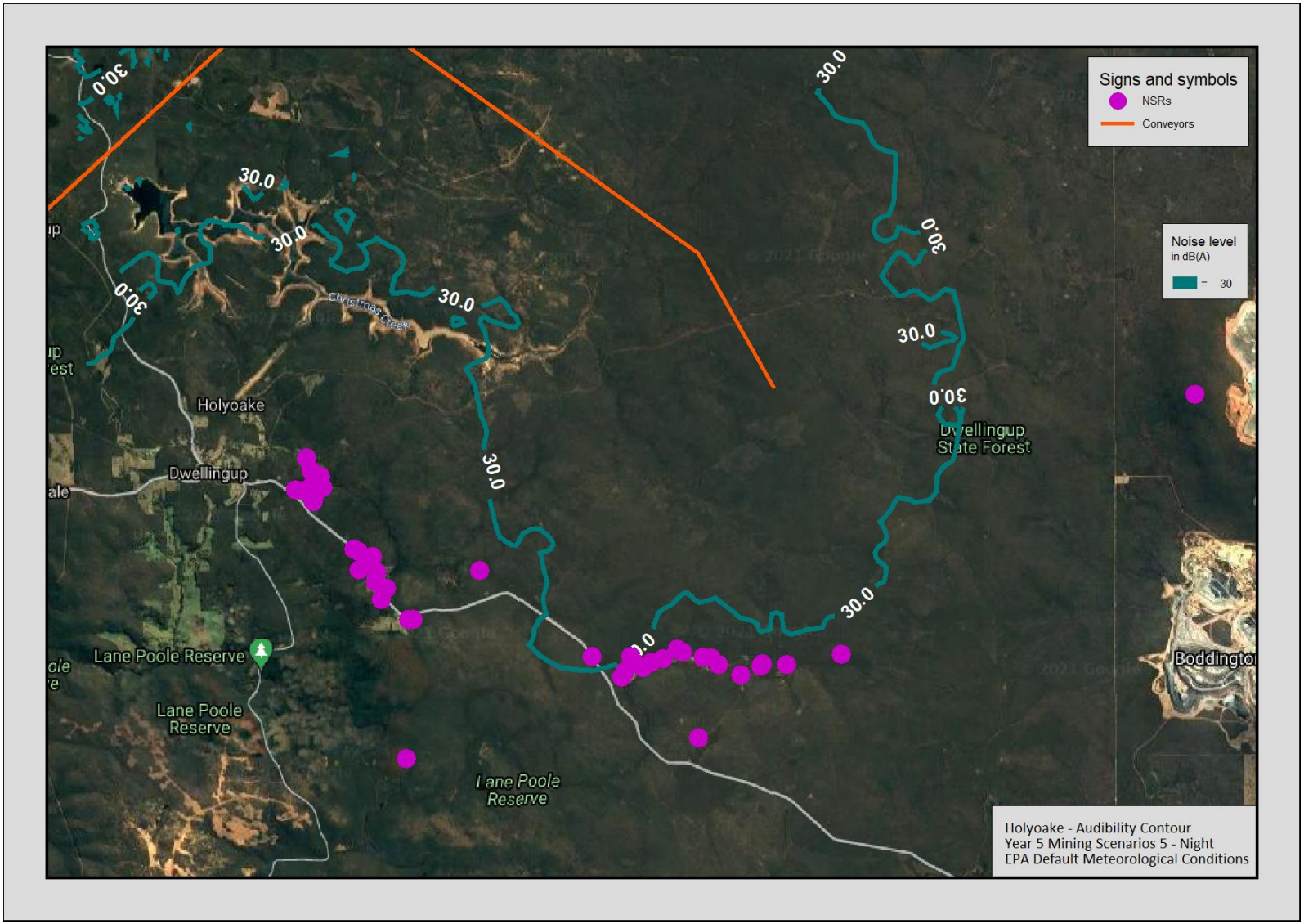

Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Dwellingup State Forest
Boddington
Holyoake - Audibility Contour
Year 3 Mining Scenarios 3 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Dwellingup State Forest
Boddington
Holyoake - Audibility Contour
Year 3 Mining Scenarios 3 - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Holyoake - Audibility Contour
Year 4 Mining Scenarios 4 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup State Forest
Lane Poole Reserve
Lane Poole Reserve
Lane Poole Reserve
Christmas Creek
Holyoake - Audibility Contour
Year 4 Mining Scenarios 4 - Night
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake - Audibility Contour
Year 5 Mining Scenarios 5 - Day
EPA Default Meteorological Conditions


Signs and symbols
NSRs
Conveyors
Noise level
in dB(A)
= 30
30.0
Holyoake
Dwellingup
Dwellingup
State Forest
Lane Poole Reserve
Lane Poole
Reserve
Lane Poole
Reserve
Christmas Creek
Holyoake - Audibility Contour
Year 5 Mining Scenarios 5 - Night
EPA Default Meteorological Conditions