APPENDIX M

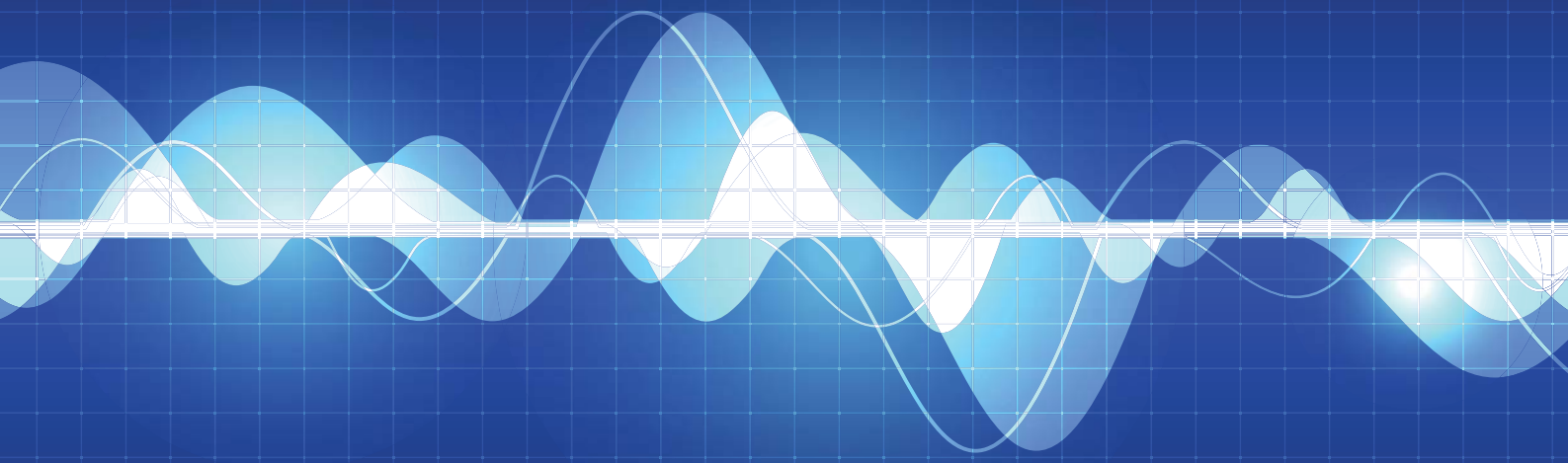
Appendix M - Noise and Vibration Impact Assessment

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Tahmoor South Project

Noise and vibration impact assessment

Prepared for Tahmoor Coal Pty Limited
November 2018



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November 2018

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Tahmoor South Project

Noise and vibration impact assessment

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Tahmoor Coal Pty Limited

Date

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Version

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Prepared by	**Approved by**
	
Katie Teyhan	**Najah Ishac**
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22 November 2018	22 November 2018

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

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Executive Summary

ES1 Existing and proposed development

Tahmoor Coal is seeking development consent for the continuation of underground mining at Tahmoor Mine, extending underground operations and associated infrastructure south, within the Bargo area.

Tahmoor Mine currently uses continuous mining development and longwall extraction methods to produce a current run of mine (ROM) coal output of approximately 3 Mtpa. The coal is processed at the Tahmoor Mine coal handling and processing plant (CHPP) and transported via rail to Port Kembla. Tahmoor Mine is approved for operations 24 hours a day, seven days a week with three shifts operating.

The proposed development will utilise the existing surface infrastructure at the Tahmoor Mine surface facilities area. Some upgrades are proposed to facilitate the extension. The proposed development also incorporates the planning for rehabilitation and mine closure once mining ceases.

The proposed development will make use of three ventilation shafts currently being used for the operations at Tahmoor North, including one upcast (T2) and two downcast (T1 and T3) shafts. It is noted that T2 will only be used intermittently if the new upcast shaft is off-line (see below), and is therefore not included as part of the operational scenario for the TSP.

Two additional ventilation shafts are proposed for the Tahmoor South Project as follows (refer Figure 2.1):

- TSC1: an upcast ventilation shaft that will be located on Tahmoor Coal's Charlies Point Road property; and
- TSC2: a downcast ventilation shaft that will be located on Crown Land adjacent to Tahmoor Coal's Charlies Point Road property.

An additional 50 to 175 personnel will be required for the Tahmoor South Project (TSP) development works, which may occur concurrently with the ongoing mining operations at Tahmoor North. Additional site amenities, including bath houses and onsite car parks will be required to accommodate the increased workforce during the transition period between mining operations at Tahmoor North and the Tahmoor South Project's development works.

In summary, the key components of the proposed development comprise:

- longwall mining in the Central Domain;
- mine development including underground redevelopment, ventilation shaft construction, pre-gas drainage and service connection;
- upgrades to the existing surface facilities area including:
  - upgrades to the CHPP;
  - expansion of the existing rejects emplacement area (REA);
  - additional mobile plant for coal handling;
  - additions to the existing bathhouses, stores and associated access ways; and

- upgrades to onsite and offsite service infrastructure, including electrical supply.

- rail transport of product coal to Port Kembla, and Newcastle (from time to time); and
- mine closure and rehabilitation; and
- environmental management.

ES2 Assessment methodology

EMM has prepared this noise and vibration assessment in accordance with the requirements of the DPE as provided in the SEARs dated 9 June 2017.

The operational noise assessment has been undertaken in accordance with the Industrial Noise Policy (INP) (EPA, 2000) with reference to the Noise Policy for Industry (NPfI) (EPA, 2018) and the Voluntary Land Acquisition and Mitigation Policy (VLAMP) (NSW Government, 2018) where relevant.

Road traffic noise associated with operation and construction of the TSP has been predicted and assessed in accordance with the Road Noise Policy (RNP) (DECCW, 2011).

Noise and vibration from construction activity associated with the TSP has been assessed in accordance with The Interim Construction Noise Guideline (ICNG) (DECC, 2009) and Assessing Vibration: a technical guideline. (DEC, 2006).

ES3 Operational noise assessment

The following methodology, consistent with Section 10 of the INP which describes how the INP applies to existing sties, has been adopted:

1. Measure and determine existing background and ambient noise levels.
2. Measure and predict noise levels produced by Tahmoor Mine, having regard to meteorological effects such as from wind and temperature inversion.
3. Determine project-specific noise levels (PSNL) from intrusive and amenity noise criteria.
4. Compare the measured and/or predicted noise levels from the site with the PSNL.
5. Where the PSNL are exceeded, assess feasible and reasonable noise mitigation strategies.
6. Determine achievable noise limits for the site.
7. Describe the additional noise reduction measures to be implemented and their proposed timing.

ES3.1 Existing background and ambient noise levels

The nearest private dwellings (houses) and other noise-sensitive developments (eg Anglican Church and College) have been identified for the purpose of this assessment and are referred to in this report as assessment locations. Assessment locations have been categorised in nine noise catchment areas (NCA) based on similar ambient acoustic environments. These catchment areas are described further in Section 6.1. Assessment locations and the relevant NCA are shown in Figure 5.1.

Unattended and operator-attended noise monitoring was completed by EMM at five locations surrounding the site in May 2018. Results of previous unattended noise monitoring undertaken by Atkins Acoustics in 2012 was used to supplement the current data. Results of ambient noise monitoring, provided in Table 5.1, have been used to quantify the existing acoustic environment at all assessment locations and establish relevant rating background levels (RBL) for the purpose of establishing project specific noise levels (PSNL).

ES3.2 Existing mine noise

ES3.2.1 Existing noise criteria

Current noise criteria for Tahmoor Mine are provided in Conditions 73 and 74 of the Talbot J's judgement in Kembla Coal & Coke Pty Limited v Wollondilly Shire Council (1994) NSWLEC (7 September 1994). The approval states the following:

> Condition 73. The noise level emanating from Tahmoor Mine and any associated facilities, including the washery, stock pile area and rail loading facility, shall not exceed an L10 level of 45dBA when measured within 3 m of any residence.
>
> Condition 74. The noise emanating from operations at the refuse emplacement site shall not exceed an L10 of 37dBA or background +5dBA whichever is the greater when measured 3 m of any residence.

The development consent does not contain any maximum noise event criteria for the night-time. Further, residential dwellings have been approved and built nearer to the mine than those that already existed at the time of the 1994 consent.

Environment Protection Licence (EPL) 1389 does not contain any noise limits relevant to the site nor any requirement to monitor noise emissions. However, it has previously included a number of Pollution Reduction Programs (PRPs).

ES3.2.2 Existing noise mitigation and management

Noise mitigation and management measures that are currently implemented at the site include, but are not limited to, enclosure of acoustically significant fixed plant, broadband reversing alarms on all surface mobile equipment, acoustic barriers and concrete coal storage bins.

EPL 1389 for Tahmoor Mine has also included a number of PRPs with the aim of reducing noise emissions from the site. The completed noise related PRPs are summarised as follows:

- PRP12 – Noise Assessment Survey – Completed 31 March 2007;
- PRP13 – Stage 2 Noise Investigation and Mitigation Program – Completed 31 January 2009;
- PRP14 – Noise Mitigation Program – Completed 31 December 2009;
- PRP16 – Noise Survey Review and Assessment – Completed 30 May 2011;
- PRP17 – Review of Noise Mitigation Works – Completed 29 July 2011; and
- PRP 18 – Feasible and Reasonable Noise Mitigation Works – Completed 29 September 2011.

Works associated with the PRPs have been implemented and completed to the EPA's requirements. Noise mitigation works undertaken as part of PRPs are summarised in Section 4.2.

In September 2011 Tahmoor Coal reported to the EPA that Pollution Reduction Program 18 (Noise Mitigation Works) had been completed. Correspondence from the EPA (4 February 2013) confirmed that noise from Tahmoor Mine (banging, crashing and reversing alarms) had been reduced compared with monitoring conducted in 2007.

Noise at the mine is monitored through quarterly attended night-time surveys, and by the two continuous real-time noise monitors which operate 24 hours per day 7 days per week. The continuous real-time noise monitor located on site has been programmed with pre-defined alarm trigger levels, which are linked to the site's control room and Citect control system, for monitoring night-time operational noise. The system (detailed in the site document TAH SD PRO 0008 Noise Alarm Procedure & TARP) allows the site to proactively manage noise levels during night-time hours, with the intent of managing identified elevated noise levels as they occur, ultimately reducing the number of community complaints.

Data from the quarterly attended noise monitoring reports are reviewed against the site's noise limits to assess compliance with the conditions of consent. Noise level data and audio recordings from the two real-time monitors are also used to verify compliance with noise limits (and conditions of consent), particularly in response to community complaints or other specific enquiries or investigations.

ES3.2.3 Existing mine noise emissions

The noise impact assessment for the original development application was prepared prior to the INP. A very different assessment methodology was utilised including the use of different noise parameters and it excluded the requirement to consider the effects of meteorological conditions on noise emissions. Hence, compliance noise monitoring has typically occurred during calm weather conditions.

A summary of the quarterly noise monitoring results, as provided in the quarterly reports, for the period between Q1 2014 and Q1 2018 (ie 17 rounds of monitoring) is shown in Table 4.1 together with the criteria applicable at each location. It is noted that noise criteria do not apply at some of the monitoring locations since they are not noise-sensitive receptors. Results indicate that noise levels are generally in compliance with the existing noise limits (ie within 2 dB) at the relevant residential monitoring locations.

Measured night-time L_{Aeq} one-third octave band centre frequency levels (10-160 Hz), LFN threshold levels (NPfI) and C minus A weighted levels for the November 2017 and January 2018 attended noise monitoring periods are shown in Table 4.2 and Table 4.3. These results indicate that low frequency noise above the current relevant NPfI thresholds is present in the vicinity of Olive Lane (locations M3 and M4) and the Wollondilly Anglican Church and College (location M2). Levels marginally above the relevant thresholds were also measured in the vicinity of the existing ventilation shaft (T2) (location M8) during the January survey only. It is not expected that this marginal exceedance was due to operation of the ventilation fan alone since it only occurred during one of the surveys.

ES3.3 Operational noise criteria

The project specific noise levels (PSNLs) are the more stringent of either the intrusive or amenity criteria. The PSNLs were determined for the project for all relevant assessment periods and are shown in 'bold' text in Table 6.3. In all instances, the intrusive criteria are more limiting for residences.

The INP provides guidance on the application of noise criteria to existing industrial sites such as the Tahmoor Mine.

The INP Application Notes state that if PSNLs are not achieved from existing operations, "*a preliminary analysis of potential noise mitigation measures, and conceptual noise reductions, needs to be undertaken for the existing premises.*" Decisions regarding the required noise mitigation measures will be made on a case-by-case basis and take into account various factors including, but not limited to, the feasible and reasonable mitigation options, the absolute level of noise, likely improvement to existing noise levels and existing measures of community impact including complaints. This may result in less stringent noise limits than the PSNL.

ES3.4 Operational noise – existing and proposed TSP

Operational noise sources and associated sound power levels used in the noise model are summarised in Table 7.1. The equipment items and quantities are based on the current operations. Most of the sound power data were obtained from noise measurements of existing activities at the site. Where this was not possible, sound power data has been obtained from an EMM database of similar plant and equipment. Consideration has been given to low frequency noise (LFN) modifying factors where relevant.

Noise from existing operations was modelled and calibrated to the results of operator-attended noise surveys around the site. Noise from operation of the proposed TSP was also predicted.

Results of operational noise modelling (shown in table format in Appendix C and as indicative noise contours in Appendix D) indicated that PSNLs were exceeded at a number of assessment locations. Hence, an assessment of reasonable and feasible noise mitigation was undertaken.

ES3.5 Feasible and reasonable noise mitigation

Consideration of the feasibility and reasonableness of existing and additional noise mitigation measures has been undertaken with reference to the guidance provided in the INP and Section 3.4 of the NPfI. The NPfI also provides the following guidance on the application of noise mitigation to existing premises:

> The range of noise reduction strategies for existing situations is generally more limited than those available for new development at the planning stage. For example, spatial separation between the source and receiver is not an option for existing situations. The initial focus for existing sites should be operational procedures and prioritising noise-control measures that provide the greatest benefits to residents at least cost.

Mitigation strategies have been considered in the following hierarchical approach:

1. control of noise at the source;
2. once the feasible and reasonable controls at the source are exhausted, controlling the transmission of noise; and
3. once source and transmission feasible and reasonable controls are exhausted, considering mitigation measures at the noise-sensitive receivers.

In evaluating the available noise mitigation options the following factors have been considered:

- Noise impacts:
  - existing and future noise levels, and projected changes in noise levels; and
  - the amount by which the triggers are exceeded.
- Noise mitigation benefits:
  - amount of noise reduction expected; and
  - number of people likely to benefit.
- Cost-effectiveness of noise mitigation:

- total cost of mitigation measures (including capital and maintenance); and
- ongoing operational and maintenance cost borne by the community (eg running air conditioners if closing dwelling windows is required to improve noise).

- Community views:
  - aesthetic considerations; and
  - views of all potentially affected areas determined through community consultation.

The main operational noise sources at the site are the CHPP and dozers. Other significant sources that contribute to off-site noise emissions include rail loading activity (locomotives and loading coal into wagons), compressors and the reject haul truck. Mitigation options targeting these noise sources have been considered as provided in Table 7.2.

All measures identified as reasonable and feasible were incorporated into the noise model for the site. It is anticipated that these measures will be completed within three years of physical commencement of the TSP.

Noise prediction results for the mitigated TSP scenario are shown in table format in Appendix C and as indicative noise contours in Appendix D. For simplicity and due to the significant number of assessment locations modelled, detailed single-point results have only been provided where noise emissions under noise-enhancing weather conditions are predicted to be above the PSNL.

Predicted noise impacts from the mitigated TSP under noise-enhancing weather conditions have been categorised as per Table 1 of the VLAMP (refer table in Appendix C and figure in Appendix E).

Table 7.4 provides a summary of the number of assessment locations for each operational scenario (existing, unmitigated TSP and mitigated TSP) where predicted noise emissions are in the following categories:

1. No more than 2 dB above PSNL;
2. 3-5 dB above PSNL; and
3. More than 5 dB above PSNL.

Table ES1 Number of assessment locations compared to PSNLs

Category	Existing Tahmoor mine			TSP Unmitigated			TSP Mitigated		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Noise-enhancing									
No more than 2dB above PSNL	2585	2556	2464	2585	2553	2460	2683	2657	2716
3-5 dB above PSNL	128	133	172	124	129	167	70	70	28
More than 5 dB above PSNL	50	74	127	54	81	136	10	36	19
Calm									
No more than 2dB above PSNL	2697	2675	2619	2700	2675	2610	2749	2721	2743
3-5 dB above PSNL	58	67	86	55	68	95	12	35	12
More than 5 dB above PSNL	8	21	58	8	20	57	2	7	7

Key points from the operational noise assessment are summarised as follows:

- Development of the TSP will result in a significant reduction in the number of privately-owned dwellings affected by night-time mine noise emissions more than 5 dB above the relevant PSNL; 19 for operation of the mitigated TSP compared to 127 for existing Tahmoor mine operations.

- As per the results presented in Appendix C, mine noise with the mitigated TSP is expected to reduce at assessment locations compared to existing levels by at least 2 dB and up to 9 dB at all assessment locations during the night-time period.

- Mine noise with the mitigated TSP during the day and evening periods is expected to reduce by up to 6 dB compared to existing levels at all but two assessment locations. The exceptions are the residences at 185 and 215 Charlies Point Road where noise levels are predicted to increase by 3 dB as a result of the southern extension to the REA and the new ventilation fans. Predicted night-time noise levels at these two properties are 40 dB and 39 dB (ie 5 dB and 4 dB above PSNLs, respectively).

- Mine noise at the Anglican Church and school are predicted to achieve the relevant internal amenity noise levels.

- Table 7.5 provides a summary of the number of assessment locations in each noise impact category in accordance with Table 1 of the VLAMP. The figure provided in Appendix E shows the assessment locations categorised as significant, moderate, marginal or negligible, consistent with VLAMP definitions. In some cases, locations categorised as significant are relatively further from the mine than those with a moderate or marginal impact category. This is due to several factors including rounding of noise predictions, local topographical features and the relative criteria for these locations (intrusive and amenity).

Table ES2 Number of assessment locations in each VLAMP noise impact category for mitigated TSP

Satisfies PSNL	Negligible	Marginal	Moderate	Significant[1]
2538	93	83	28	20

Note 1: Although there are 19 properties where the night-time PSNL is predicted to be exceeded by more than 5 dB, there are 20 properties where impacts are categorised as "significant" due to consideration of impacts during other periods.

ES3.6 Achievable noise limits

Tahmoor Coal will continue to investigate options for further noise mitigation into the future including, but not limited to, the following:

- consideration of a new haul truck for use in the REA with the inclusion of noise attenuation and/or noise specification in the supply contract;

- additional investigations regarding mitigation for the CHPP; and

- consideration of noise mitigation initiatives in the purchase and/or design of all new equipment as well as any new site buildings and access roads.

Chapter 8 of the INP describes the process regarding negotiation where noise emissions are predicted to be above the PSNLs. Section 8.2 of the INP states that "*Negotiation on what represents the best achievable level that is practicable for a development is often an iterative process involving both the proponent and regulator/consent authority and the proponent and affected community.*" Section 10.1 of the INP also states that "*Where noise emissions from the site exceed the project-specific noise levels, the regulatory authorities and the noise-source manager need to negotiate achievable noise limits for the site. The project-specific noise levels should not be applied as mandatory noise limits. The project-specific noise levels supply the initial target levels and drive the process of assessing all feasible and reasonable control measures. Achievable noise limits result from applying all feasible and reasonable noise control measures. For sites with limited mitigation measures the achievable noise limits may sometimes be above the project-specific noise levels.*"

To assist in the negotiation process Table 7.6 provides a summary of the predicted noise levels at nine locations around the mine. These locations (refer Figure 7.1) have been selected from the ten existing quarterly noise monitoring locations with the exceptions being M1 and M10. Location M1 is the service station located south of the Anglican College and is not considered necessary given that it is not a particularly noise-sensitive receptor and given the close proximity of selected location M2. Given the proximity of M10 to the REA extension it is recommended that 80 Charlies Point Road would be a more appropriate noise monitoring location.

Table ES3 Predicted 'achievable' noise levels (noise enhancing)

Location	PSNL ($L_{Aeq,15\ minute}$,dB unless otherwise noted)			Existing Tahmoor mine operations ($L_{Aeq,15\ minute}$,dB)			Mitigated TSP ($L_{Aeq,15\ minute}$,dB)			Predicted change in mine noise (dB)		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
C1. Wollondilly Anglican College and Church (M2)	$L_{Aeq,period}$ 50 (when in use)			59	62	62	56	59	57	-3	-3	-5
C2. 7 Olive Lane (M3)	46	45	37	55	58	58	51	54	51	-4	-4	-7
C3. Eastern end of Olive Lane (M4)	n/a	n/a	n/a	59	62	62	55	58	55	-3	-3	-7
C4. Northern service station on Remembrance Drive (M5)	$L_{Aeq,period}$ 65 (when in use)			50	50	50	47	47	44	-2	-2	-6
C5. Southern end of Stratford Rd (M6)	39	37	37	46	46	46	44	44	39	-2	-2	-7
C6. Eastern end of Hodgson Grove (M7)	37	35	35	42	42	42	40	40	34	-1	-1	-8
C7. Rockford Road, near existing vent fan (M8)	35	35	35	40	40	40	37	37	31	-3	-3	-9
C8. Kammer Place (M9)	35	35	35	36	36	36	35	35	31	-1	-1	-5
C9. 80 Charlies Point Road (to replace M10)	35	35	35	42	42	42	40	40	36	-2	-2	-6

Notes: 1. Noise level predictions presented in this table include the relevant LFN modifying factor.

ES4 Sleep disturbance assessment

The current consent and EPL do not contain any limits with regard to night-time maximum noise levels and maximum noise events from the mine are not recorded during the quarterly operator-attended noise compliance surveys.

Maximum noise levels from existing operations have previously been the subject of a PRP relevant to the site. As described in Section 4.2, engineered mitigation controls have been effectively implemented as part of the Tahmoor Mine's PRPs to reduce and control maximum noise events. Controls specific to the reduction of maximum noise events that have been implemented over time include the following:

- laminated transfer chutes at conveyor transfer points;
- lagging of the reject stone bin;
- limit switches to ensure the stone bin levels are maintained at not less than 30% full to avoid impact noises associated with empty bins;
- replacement of mobile plant reversing alarms with low level, broad-spectrum alarms (colloquially referred to as "quackers"); and
- installation of an onsite real-time noise monitor.

Noise reduction measures that have been considered as part of the mitigated TSP will have the effect of further reducing maximum noise levels from site. These measures include the following as described in Section 7.3:

- increased height of barrier adjacent to the north-western side of the rail loop;
- improvement to feed chute into rail wagons to reduce impact noise when loading of coal commences into each wagon;
- additional cladding and insulation on CHPP building;
- noise-suppression kit for dozer; and
- no activity (haulage or dozer) will occur in the REA during the night time.

It is expected that both the frequency and level of maximum noise events from the TSP will be lower compared to the existing operation due to the mitigation measures to be implemented as part of the TSP.

Operation of the TSP during the night-time is likely to result in maximum noise events below those likely to cause awakening reactions.

ES5 Road traffic noise assessment

The nearest residential facades potentially affected by an increase in road traffic volumes as a result of the TSP are mostly located on Remembrance Driveway, north and south of the site access road. Road traffic movements associated with some of the proposed construction activities (ie TSC1 and TSC2 vent shaft construction) will require the use of additional roads surrounding the site including Rockford Road (from Remembrance Driveway north of the site access road) and Charlies Point Road. Hence, the potential for road traffic noise impact has also been considered at the nearest residential facades along these roads during the TSC1 and TSC2 vent shafts construction (scheduled for between 2019-2023).

Existing and proposed traffic volumes were referenced from the *Traffic Impact Assessment for Tahmoor South Project* prepared by Transport and Urban Planning Pty Ltd (TUP) November 2018. This assessment has predicted road traffic noise levels for the worst-case year (2020) and is considered to be conservative for the TSP. Road traffic noise levels generated by TSP-related traffic movements are expected to be lower during other TSP operational and/or construction years.

Based on the results of road traffic noise predictions, future (2020) road traffic noise levels including the proposed TSP (peak) traffic volumes at the nearest receivers on most roads are predicted to marginally increase by up to 1 dB for the relevant periods. Such an increase is considered negligible and satisfies the RNP 2dB allowance increase following all feasible and reasonable mitigation measures. At receivers along Charlies Point Road, future (2020) road traffic noise levels are predicted to increase by up to 7 dB and 8 dB compared to the existing (2017) levels of road traffic noise calculated for day and night. However, this is below the RNP road traffic relative increase criteria ($L_{Aeq,period}$ + 12 dB) for residential land uses and overall road traffic noise levels are predicted to be below the relevant day and night-time criteria. Therefore, the TSP is not expected to generate road traffic noise impacts at the nearest potentially affected receivers.

ES6 Construction noise and vibration

ES6.1 Construction noise

Site establishment and construction activities associated with the ventilation shafts (other than drilling) would be undertaken between 7 am and 6 pm Monday to Friday, and 8 am to 1 pm Saturday, and therefore consistent with the ICNG standard hours. Ventilation shaft drilling would be continuous 24 hours a day, 7 days a week.

TSC1 is proposed to be constructed over a period of approximately 2 years; 18 months of site establishment and developing site access followed by fan installation over approximately 6 months. Construction of TSC2 will follow immediately after TSC1 is complete (ie not concurrently) and over a similar timeframe.

Mobilisation for each site would include delivery of approximately forty (40) standard and two (2) wide semitrailer loads of drill rig components, auxiliary drill rig items, storage containers, temporary site amenities and construction equipment. Civil works to establish the drilling area and associated water holding facilities will also be required.

Construction noise levels were modelled using Brüel & Kjær 'Predictor' software, as per the operational modelling.

Predicted noise levels over a typical worst case 15-minute scenario were modelled and assessed for comparison against the relevant NMLs. Noise predictions were undertaken assuming calm and noise-enhancing weather conditions.

A summary of predicted construction noise emissions is provided in Table 10.2 for select representative assessment locations. The assessment locations nearest the proposed construction site are all located within NCA 4 and are all representative of typically rural locations. Hence, minimum construction noise NMLs have been applied.

Table ES4 Predicted construction noise levels – noise-enhancing conditions

Location	Predicted construction noise, $L_{Aeq,15min}$, dB					
	TSC1			TSC2		
	Site Est. (Standard hours)	Drilling (Standard hours)	Drilling (Outside standard hours)	Site Est. (Standard hours)	Drilling (Standard hours)	Drilling (Outside standard hours)
215 Charlies Point Rd	58	48	39	62	52	44
185 Charlies Point Rd	67	57	44	66	56	50
80 Charlies Point Rd	52	42	<35	51	41	<35
Nearest on Great Southern Rd	45	35	<35	42	<35	<35
70 Warrobyn Rd	48	38	<35	52	42	<35
Nearest on Ironbark Rd	42	<35	<35	41	<35	<35
Nearest on Remembrance Dr	46	36	<35	43	<35	<35
NML ($L_{Aeq,15\ minute}$, dB)	**40 75 highly affected**	**40 75 highly affected**	**35**	**40 75 highly affected**	**40 75 highly affected**	**35**

Notes: Standard hours are Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm and no work on Sundays or Public Holidays.

Construction noise levels are predicted to be above the NML but below the highly noise affected level for all works during standard construction hours. This is not an uncommon finding for construction projects. Further, given that the predictions assume noise-enhancing conditions as well as simultaneous operation of plant and equipment, it is likely that actual construction noise levels would be less than those predicted for most of the time. Notwithstanding, noise mitigation measures and application of good practice noise management have been considered. Noise mitigation and management measures are discussed below.

Construction noise levels outside of standard hours are predicted to be above the NML at the two nearest privately-owned residences on Charlies Point Road. It is noted that Tahmoor Coal has commenced negotiations with the owners of both of these properties.

Noise from the out-of-hours activity will generally be continuous in nature and therefore given the magnitude of predicted L_{Aeq} construction noise levels, the maximum noise level (ie L_{Amax}) from this activity is likely to be below the relevant sleep disturbance screening criteria at all nearby assessment locations.

Tahmoor Coal will manage construction noise levels where exceedances of NMLs have been identified. The construction noise management methods will be detailed in a construction noise management plan which will be developed prior to commencement of construction activities and include, but not be limited to, the following:

- a detailed assessment of feasible and reasonable work practices that will be implemented to minimise noise impacts;
- strategies to promptly deal with and address noise complaints;
- procedures for notifying nearby residents of forthcoming works that are likely to produce noise impacts; and
- consideration of respite periods.

The ICNG recommends the following where NMLs are predicted to be exceeded:

- application of feasible and reasonable work practices to minimise noise;
- inform potentially impacted residents of the nature of the works to be carried out, expected noise levels and duration and relevant contact details; and
- negotiation with the community where noise from work outside standard hours is predicted to exceed the relevant NML by more than 5 dB.

Tahmoor Coal shall manage construction noise from the site by adopting work practices such as:

- constructing during ICNG standard hours only where practicable;
- regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration;
- avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon residents;
- parking of vehicles in locations and ways to minimise noise;
- minimising the need for vehicle reversing for example, by arranging for one-way site traffic routes (largely achieved by site layout design);
- use of broadband audible reverse alarms on vehicles and elevated work platforms used on site; and
- minimising the movement of materials and plant and unnecessary metal-on-metal contact.

ES6.2 Construction vibration

The potential for impacts from vibration has been assessed for construction activity associated with the TSP. Vibration from operational activity is not expected to change and given the separation distance between the site and the nearest residence (>200m), ground-borne vibration from equipment operating at the pit-top is not expected to be perceptible.

Based on the safe working distances for typical plant items (refer Table 11.1) and the location of surrounding privately owned residential properties, it is unlikely that human response vibration criteria will be exceeded. Privately-owned assessment locations are generally greater than 170 m away from any likely construction activity, which is greater than the maximum safe working distance of 100 m for an 18 tonne (or greater) vibratory roller. Because human response criteria are more stringent than cosmetic damage criteria, it is also highly likely that cosmetic damage criteria would be satisfied at privately owned residential properties. The exception to this is the residence at 185 Charlies Point Road; vibration intensive construction plant may operate within approximately 30 m of this residence when site establishment activities occur for TSC1.

It is noted that Tahmoor Coal have commenced consultation with the resident at 185 Charlies Point Road. Tahmoor Coal will monitor and manage construction noise and vibration, which will include preparing a construction noise and vibration management plan.

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Glossary

Abbreviation or term	Definition
ABL	The assessment background level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Amenity noise criteria	The amenity noise criteria relate to existing industrial noise. Where industrial noise approaches base amenity noise criteria, then noise levels from new industries need to demonstrate that they will not be an additional contributor to existing industrial noise.
CEMP	Construction environment management plan
Day period	Monday–Saturday: 7.00 am to 6.00 pm, on Sundays and public holidays: 8.00 am to 6.00 pm.
dB	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale which attempts to closely approximate the frequency response of the human ear. There is also a C-weighting which is most commonly used in the assessment of low frequency noise.
DP&E	Department of Planning and Environment
EA	Environmental assessment
EMM	EMM Consulting Pty Limited
EP&A Act	*Environmental and Planning Assessment Act 1979* (NSW)
EPA	The NSW Environment Protection Authority (formerly the Department of Environment, Climate Change and Water).
Evening period	Monday–Saturday: 6.00 pm to 10.00 pm, on Sundays and public holidays
ICNG	Interim Construction Noise Guideline
INP	Industrial Noise Policy
Intrusive noise criteria	The intrusive noise criteria refers to noise that intrudes above the background level by more than 5 dB.
L_{A1}	The A-weighted noise level exceeded for 1% of the time.
L_{A10}	The A-weighted noise level which is exceeded 10% of the time. It is roughly equivalent to the average of maximum noise level.
L_{A90}	The A-weighted noise level that is exceeded 90% of the time. Commonly referred to as the background noise level.
L_{Aeq}	The A-weighted energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The $L_{eq(15min)}$ descriptor refers to an L_{eq} noise level measured over a 15minute period.
Linear peak	The peak level of an event is normally measured using a microphone in the same manner as linear noise (i.e. unweighted), at frequencies both in and below the audible range.
L_{Amax}	The A-weighted maximum sound pressure level received during a measuring interval.
Night period	Monday–Saturday: 10.00 pm to 7.00 am, on Sundays and public holidays: 10.00 pm to 8.00 am.
NMP	Noise management plan
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)

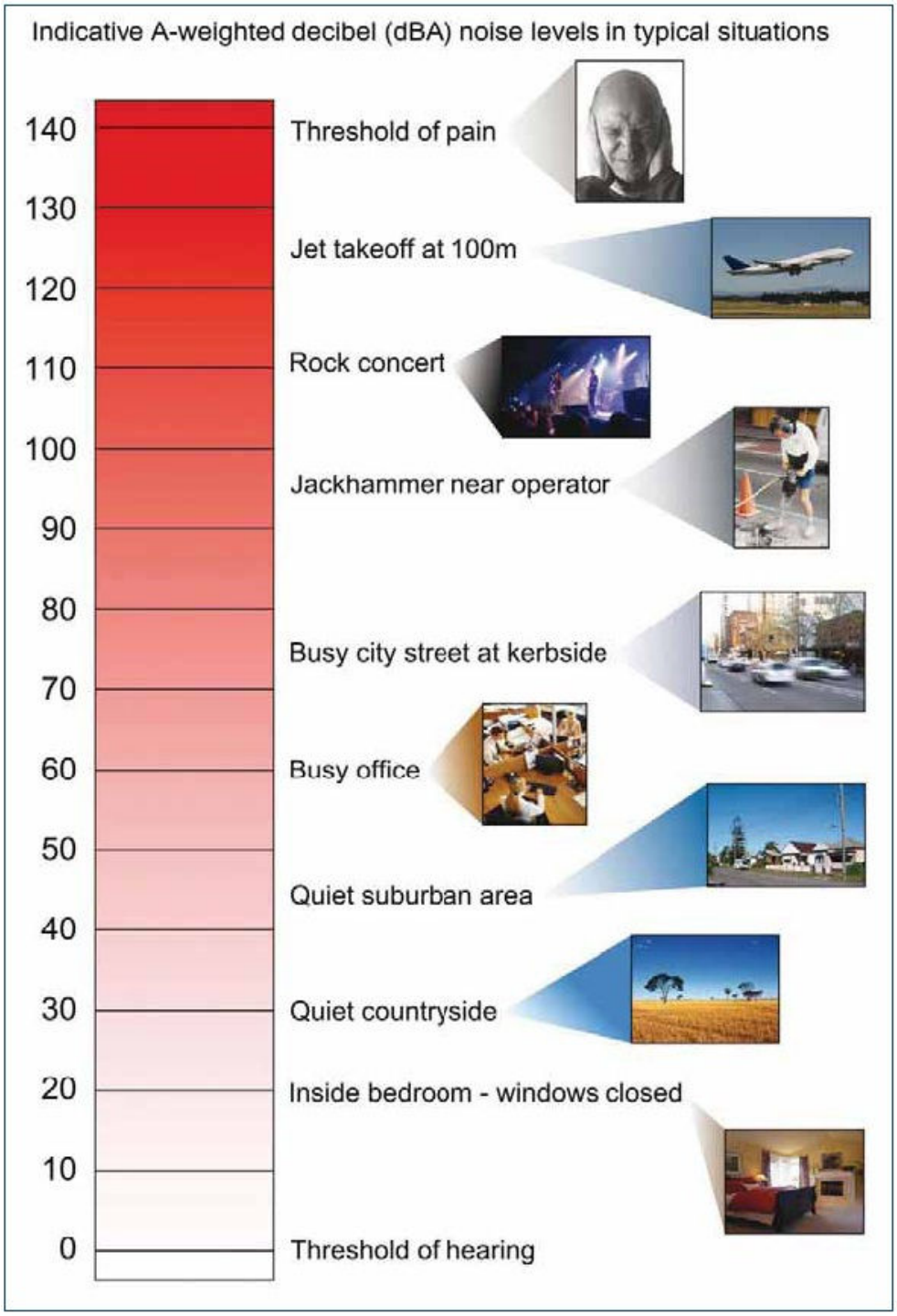
Abbreviation or term	Definition
PSNL	The project specific noise level (PSNL) is criteria for a particular industrial noise source or industry. The PSNL is the lower of either the intrusive noise criteria or amenity noise criteria.
RBL	The rating background level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the average background levels.
RNP	Road Noise Policy
SEARs	Secretary's environmental assessment requirements
Sound power level (L_w)	A measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.
Temperature inversion	A meteorological condition where the atmospheric temperature increases with altitude.

Common noise levels

The table below gives an indication as to what an average person perceives about changes in noise levels. Examples of common noise levels encountered on a daily basis are provided in the Figure below.

Perceived change in noise

Change in sound level (dB)	Perceived change in noise
1-2	generally indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times as loud (or quarter) as loud



Source: *Road Noise Policy (DECCW 2011).*

Common sources of noise with levels

1 Introduction

1.1 Overview

Tahmoor Coal Pty Ltd (Tahmoor Coal) owns and operates the Tahmoor Mine, an underground coal mine between the townships of Tahmoor and Bargo, approximately 80 km south-west of Sydney in the Southern Coalfields of NSW. Tahmoor Mine produces up to 3 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Tahmoor Mine commenced operations in 1979 with road access from Remembrance Driveway, a rail loop connected to the Main Southern Rail Line, coal processing and storage.

Tahmoor Coal is seeking approval for the Tahmoor South Project (the proposed development), being the extension of underground coal mining at Tahmoor Mine to the south of the existing Tahmoor Mine surface facilities area. The proposed development seeks to extend the life of underground mining at Tahmoor Mine until approximately 2035. The proposed development will enable mining to be undertaken within the southern portion of Tahmoor Coal's existing lease areas and for operations and employment of the current workforce to continue for approximately a further 13 years.

The Tahmoor South Project comprises an area adjacent to, and to the south of, the existing approved Tahmoor mine. It also overlaps a small area of the existing approved Tahmoor mine comprising the surface facilities area, historical workings and other existing mine infrastructure.

The proposed development, known as the Tahmoor South Project (TSP), would continue to use longwall mining methods for the extraction of up to 4 Mtpa of ROM coal from the Bulli seam. The ROM coal brought to the surface would be processed at Tahmoor Mine's existing Coal Handing and Preparation Plan (CHPP) and transported via the existing rail infrastructure to Port Kembla.

1.2 Assessment guidelines and requirements

This noise and vibration assessment has been prepared following the appropriate guidelines, policies and industry requirements. Guidelines and policies referenced in this report are as follows:

- NSW Environment Protection Authority (EPA) 2000, *Industrial Noise Policy* (INP);
- NSW EPA 2017, *Noise Policy for Industry* (NPfI);
- NSW Government 2018, *Voluntary Land Acquisition and Mitigation Policy For State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP);
- NSW EPA 2013, *Rail Infrastructure Noise Guideline* (RING);
- NSW Department of Environment Climate Change and Water (DECCW) 2011, *Road Noise Policy* (RNP);
- NSW Department of Environment Climate Change (DECC) 2009, *The Interim Construction Noise Guideline* (ICNG); and
- NSW Department of Environment and Conservation (DEC) 2006*, Assessing Vibration: a technical guideline.*

This assessment has been prepared in accordance with requirements of the NSW Department of Planning and Environment (DPE). These were set out in the Secretary's Environmental Assessment Requirements (SEARs) for the TSP, issued on 9 June 2017. The SEARs identify matters which must be addressed in the EIS and essentially form its terms of reference. Table 1.1 lists individual requirements relevant to this noise and vibration assessment and where they are addressed in this report.

Table 1.1 Noise and vibration related SEARs

Requirement	Section addressed
The EIS must address the following specific issues:	
Noise and Vibration – including:	
- an assessment of the likely operational, rail "wheel squeal" and construction noise impacts of the development under the NSW Industrial Noise Policy (as may be updated or replaced), paying particular attention to the obligations in chapters 8 and 9 of the policy, and the Voluntary Land Acquisition and Mitigation Policy (DPE);	Sections 3, 3.8, 7, 10. The use of the INP was confirmed during a meeting between the proponent, EPA and DPE on 16/11/2017. Further, the SEARs were issued on 9 June 2017, prior to the update to the INP. Thus, in accordance with the transitional arrangements for the NPfI, this assessment has been undertaken in accordance with the INP.
- if a claim is made for specific construction noise criteria for certain activities, then this claim must be justified and accompanied by an assessment of the likely construction noise impacts of these activities under the Interim Construction Noise Guideline;	Sections 3.6 and 10.
- an assessment of the likely road noise impacts of the development under the NSW Road Noise Policy; and	Sections 3.7 and 9.
- an assessment of the potential vibration and low frequency noise impacts of the development.	Sections 3.4, 3.9, 7 and 11.

Other government agencies have also recommended matters to be address in the EIS. The matters relevant to the assessment of noise and vibration have been reproduced in Table 1.2 together with where these are addressed in the report.

Table 1.2 Assessment recommendations from other government agencies

Agency / Recommendation	Section addressed
NSW Environment Protection Agency (EPA)	
Pit Top Noise The EPA and Tahmoor mine have received noise and vibration complaints in relation to existing pit top activities. The EIS must demonstrate how any existing noise and vibration issues will be addressed. Previous noise investigations by Tahmoor Colliery and the EPA have identified a significant low frequency noise signature (C weighted) that can be annoying to the residents when ambient noise levels fall in the evening and at night. The complaint information and corresponding noise data indicates that the major source of C-weighted noise is in the coal handling and processing plant. This information has been previously provided to the Company. The Industrial Noise Policy considers noise is additionally annoying when the C-weighted levels are 15dB or more than the A-weighted levels. While there is presently no prescribed noise criteria for C-weighted noise levels alone in NSW, the EPA's approach for 'greenfield' sites is to	Sections 3.4, 4.4, 7.4

Table 1.2 Assessment recommendations from other government agencies

Agency / Recommendation	Section addressed
seek a maximum limit on receiver level C-weighted noise of 60-65dB through the Development Approval process. The EPA recommends that the proponent consider means to reduce low frequency C-weighted noise emissions from the coal handling and preparation plant. Guidance on minimum noise performance criteria for low frequency noise can be found in the EPA's Industrial Noise Policy 2000 and the Draft Industrial Noise Guideline 2015 (Table C1 and C2).	
Vent Shafts	Section 7
The EPA has received complaints in relation to vibration and noise from vent shaft operations. The EIS should assess and document how odour, noise and vibration issues will be addressed for new and existing shafts. This includes the problematic vibration and shale oil odour emissions that occurred (and were subsequently been minimised) at the Rockford Road vent shaft.	The complaints referred to here were received between 2007 and 2012 with no complaints in this regard since 2012.
Noise and shale oil odour emissions from the new vent shafts must be modelled and meet acceptance levels in the EPA's Industrial Noise Policy 2000 and the Technical Framework – Assessment and Management of Odour from Stationary Sources in NSW.	When the new ventilation fans associated with the TSP are constructed, the existing upcast fan Shaft 2 will be used as a back up only. Odour emissions are discussed in the air quality assessment completed for the TSP (ERM 2018).

2 Project description

2.1 Existing operations

Tahmoor Mine currently uses continuous mining development and longwall extraction methods to produce a current ROM coal output of approximately 3 Mtpa.

The coal is processed at the Tahmoor Mine CHPP and transported via rail to Port Kembla.

Tahmoor Mine is approved for operations 24 hours a day, seven days with three shifts operating.

2.2 Tahmoor South Project

Tahmoor Coal is seeking development consent for the continuation of underground mining at Tahmoor Mine, extending underground operations and associated infrastructure south, within the Bargo area.

The proposed development will use longwall mining to extract coal from the Bulli seam. Extraction of up to 4 million tonnes (Mt) of ROM coal per annum is proposed as part of the development, with extraction of up to 47 Mt of ROM coal over the life of the project. The majority of product coal produced will be coking coal, with a small secondary thermal coal product.

Once the coal has been extracted and brought to the surface, it will be processed at Tahmoor Mine's existing CHPP and coal clearance facilities. The product coal will then be transported via the existing rail loop, the Main Southern Railway (MSRL) and the Moss Vale to Unanderra Railway to Port Kembla and Newcastle (from time to time) for Australian and international markets.

The proposed development will utilise the existing surface infrastructure at the Tahmoor Mine surface facilities area. Some upgrades are proposed to facilitate the extension. The proposed development also incorporates the planning for rehabilitation and mine closure once mining ceases.

The proposed development will make use of three ventilation shafts currently being used for the operations at Tahmoor North, including one upcast (T2) and two downcast (T1 and T3) shafts. It is noted that T2 will only be used intermittently if the new upcast shaft is off-line (see below), and is therefore not included as part of the operational scenario for the TSP.

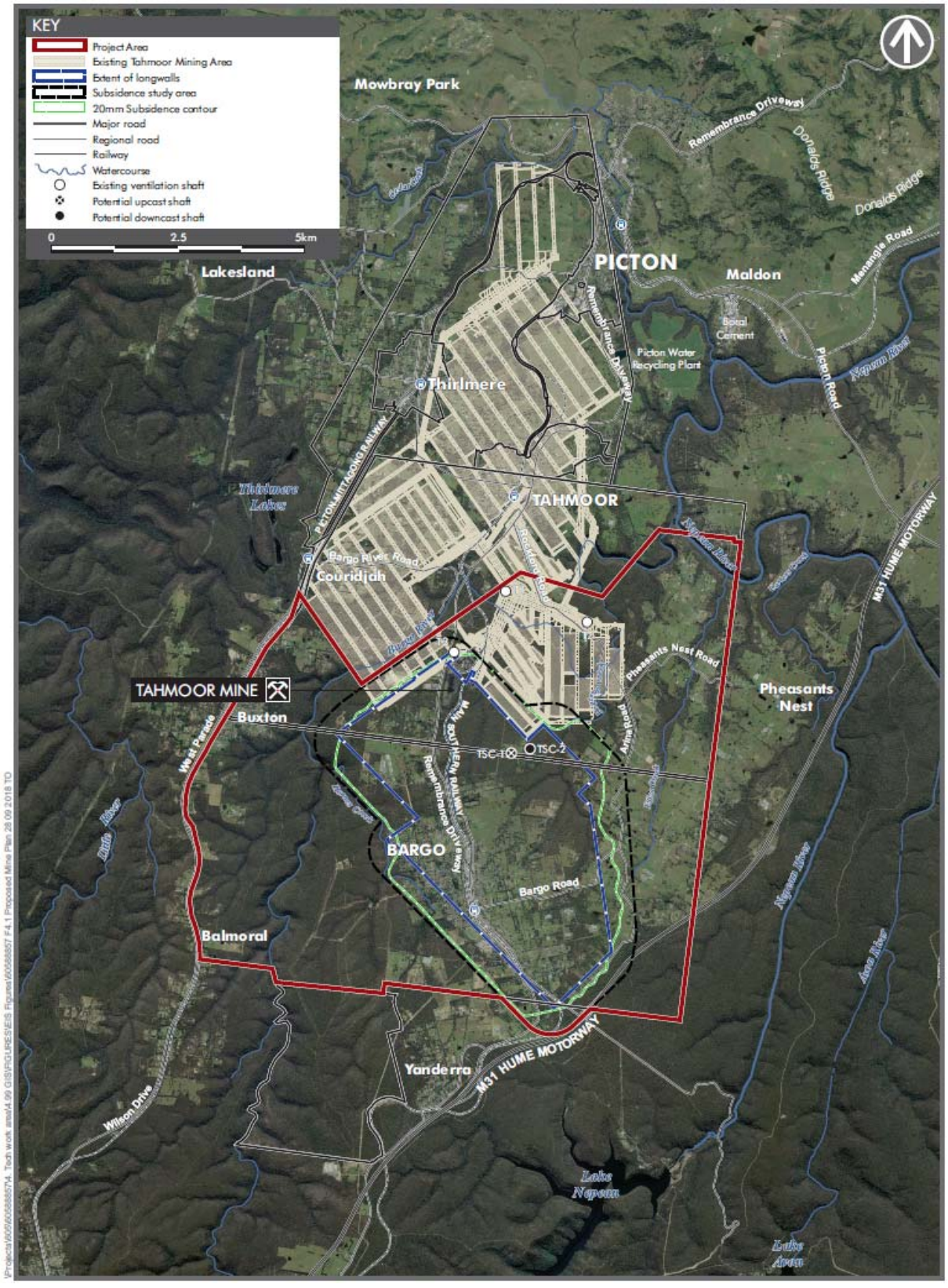
Two additional ventilation shafts are proposed for the Tahmoor South Project as follows (refer Figure 2.1):

- TSC1: an upcast ventilation shaft that will be located on Tahmoor Coal's Charlies Point Road property; and
- TSC2: a downcast ventilation shaft that will be located on Crown Land adjacent to Tahmoor Coal's Charlies Point Road property.

An additional 50 to 175 personnel will be required for the Tahmoor South Project development works, which may occur concurrently with the ongoing mining operations at Tahmoor North. Additional site amenities, including bath houses and onsite car parks will be required to accommodate the increased workforce during the transition period between mining operations at Tahmoor North and the Tahmoor South Project's development works.

In summary, the key components of the proposed development comprise:

- longwall mining in the Central Domain;
- mine development including underground redevelopment, ventilation shaft construction, pre-gas drainage and service connection;
- upgrades to the existing surface facilities area including:
    - upgrades to the CHPP;
    - expansion of the existing rejects emplacement area (REA);
    - additional mobile plant for coal handling;
    - additions to the existing bathhouses, stores and associated access ways; and
    - upgrades to onsite and offsite service infrastructure, including electrical supply.
- rail transport of product coal to Port Kembla, and Newcastle (from time to time);
- mine closure and rehabilitation; and
- environmental management.



Source: AECOM 2018

Figure 2.1 Tahmoor South Project – General layout

3 Assessment methodology

3.1 Applying the INP to existing sites

Section 10 of the INP describes how the INP is applied to existing sites, in particular those sites where existing noise emissions are above noise levels that would apply based on the current noise policy. Section 10.1 of the INP states:

> Many existing industrial sources were designed for higher noise emission levels than the criteria outlined in this policy. In other cases industries may have been in existence before neighbouring noise-sensitive developments and even before noise-control legislation was introduced. The range of mitigation measures available for these sites may be either extremely limited or costly.
>
> ...
>
> The project-specific noise levels should not be applied as mandatory noise limits. The project-specific noise levels supply the initial target levels and drive the process of assessing all feasible and reasonable control measures. For sites with limited mitigation measures the achievable noise limits may sometimes be above the project-specific noise levels.

The following steps have been utilised in the assessment of noise emissions from Tahmoor Mine and are consistent with those outlined in Section 10 of the INP:

1. Measure and determine existing background and ambient noise levels.
2. Measure and predict noise levels produced by Tahmoor Mine, having regard to meteorological effects such as from wind and temperature inversion.
3. Determine project-specific noise levels (PSNL) from intrusive and amenity noise criteria.
4. Compare the measured and/or predicted noise levels from the site with the PSNL.
5. Where the PSNL are exceeded, assess feasible and reasonable noise mitigation strategies.
6. Determine achievable noise limits for the site. Describe the noise reduction measures to be implemented and their proposed timing.

The SEARs also reference Section 8 (Negotiation process) and Section 9 (Consent/licence conditions) of the INP. These have been referenced as appropriate as part of this assessment.

3.2 Operational noise limits

3.2.1 Assessing intrusiveness

For the assessment of intrusiveness, the background noise level must be determined. The intrusiveness criterion essentially means that the equivalent continuous noise level (L_{Aeq}) of the source should not be more than 5 dB above the representative or rating background level (RBL).

3.2.2 Assessing amenity

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include road, rail and/or community noise. The existing noise level from industry must be quantified. If it approaches the criterion value, then noise levels from new industries need to be designed so that the cumulative effect does not cause noise levels to significantly exceed the criterion. For high-traffic areas there is a separate amenity criterion.

An extract from the INP that relates to the amenity noise criteria relevant to the TSP is given in Table 3.1.

Table 3.1 Amenity noise criteria - Recommended L_{Aeq} noise levels from industrial noise sources

Type of receptor	Indicative noise amenity area	Time of day[1]	Recommended $L_{Aeq(Period)}$ noise level, dBA	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
School classroom – internal	All	Noisiest 1-hour period when in use	35[2]	40
Place of worship - internal	All	When in use	40	45

Notes: Daytime 7 am to 6 pm; Evening 6 pm to 10 pm; Night-time 10 pm to 7 am. On Sundays and Public Holidays, Daytime 8 am - 6 pm; Evening 6 pm - 10 pm; Night-time 10 pm - 8 am. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
Note 10 to Table 2.1 of the INP states "In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable L_{Aeq} noise level may be increased to 40 dB $L_{Aeq(1hr)}$.

3.2.3 Project specific noise levels

Project specific noise levels (PSNL) are generally equal to the lower of the derived intrusiveness and amenity criteria. It is commonly acknowledged and accepted amongst regulators and industry that energy average noise levels are typically 3 dB[1] higher over a 15-minute worst case assessment period when compared to an entire day (11 hour), evening (4 hour) and night (8 hour) assessment period. Therefore, where the amenity criterion is less than the intrusiveness criterion minus 3 dB, it typically must be shown that the project can satisfy both.

[1] This is also consistent with the EPA's current policy.

3.3 Voluntary Land Acquisition and Mitigation Policy

The SEARs specifically reference the Voluntary Land Acquisition and Mitigation Policy (VLAMP) (DPE 2018). The VLAMP has been applied to the TSP in relation to the assessment of residual noise impacts and the process for negotiated agreements. Page 17 of the VLAMP states the following with regard to the application of voluntary mitigation and voluntary land acquisition:

> A consent authority can apply voluntary mitigation and voluntary land acquisition rights to reduce:
>
> - operational noise impacts of a development on privately owned land; and
> - rail noise impacts of a development on privately owned land near a non-network rail line (private rail line), that is on, or exclusively servicing and industrial site (see Appendix 3 of the RING);
>
> But not:
>
> - construction noise impacts, as these impacts are shorter term and can be controlled;
> - noise impacts on the public road or rail network; or
> - modifications of existing developments with legacy noise issues, where the modification would have beneficial or negligible noise impacts[13].
>
> [13] Noise issues for existing premises may be addressed through site-specific pollution reduction programs under the *Protection of the Environment Operations Act 1997*.

Of most interest is the last point above relating to legacy noise issues and the relative noise impact of the proposed operation compared to the existing development. Tahmoor Mine has been the subject of numerous pollution reduction programs (PRPs) in relation to noise, the outcomes of which have been accepted by the EPA and evidenced by a significant reduction in noise complaints over time (refer Section 4.4). Further, as this report will show, the noise emissions from the TSP are predicted to reduce compared to existing Tahmoor Mine operational noise emissions at almost all noise-sensitive receptors during the day and evening periods and, importantly, most significantly during the night-time period at all noise-sensitive receptors.

The characterisation of the noise impacts (as outlined in the VLAMP) are generally based around the human perception to changes in noise levels as explained in the glossary of the acoustic terms. For example, a change in noise level of 1 to 2 dB is typically indiscernible to the human ear. The characterisation of a residual noise impact of 0 to 2 dB above the PSNL is therefore considered negligible. This characterisation of residual noise impacts is outlined further in Table 3.2.

Table 3.2 Characterisation of noise impacts and potential treatments

If the predicted noise level minus the project noise trigger level[1] is:	And the total cumulative industrial noise level is:	Characterisation of impacts	Potential treatment
All time periods 0-2 dB	Not applicable	Impacts are considered to be **negligible**	The exceedances would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls.
All time periods 3-5 dB	< recommended amenity noise level > recommended amenity noise level but the increase in total cumulative industrial noise level resulting from development is <1 dB	Impacts are considered to be **marginal**	Provide mechanical ventilation / comfort condition systems to enable windows to be closed without compromising internal air quality / amenity.
All time periods 3-5 dB	> recommended amenity noise level and the increase in total cumulative industrial noise level resulting from the development is >1dB	Impacts are considered to be **moderate**	As for marginal impacts but also upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Day and evening > 5 dB	< recommended amenity noise level	Impacts are considered to be **moderate**	As for marginal impacts but also upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Day and evening > 5 dB	> recommended amenity noise level	Impacts are considered to be **significant**	Provide mitigation as for moderate impacts and refer voluntary land acquisition provisions
Night > 5 dB	Not applicable	Impacts are considered to be **significant**	Provide mitigation as for moderate impacts and refer voluntary land acquisition provisions

Source: VLAMP (NSW Government, 2018)

Note: 1. This terminology, project noise trigger level, is relevant to the NPfI however this assessment references the INP and thus predicted noise levels have been compared to the relevant project specific noise levels.

3.4 Low frequency noise

The EPA has suggested that low frequency noise be assessed with reference to a maximum limit of L_{Ceq} 60-65 dB (refer Table 1.2). It is noted that this assessment approach now pre-dates the current EPA approach as outlined in application notes to the INP.

The INP Application Notes state that Section 4 of the INP has been withdrawn and the modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing the characteristics of a noise source.

Fact sheet C of the NPfI (EPA 2017) provides guidelines for applying modifying factor corrections to account for low frequency noise emissions. The NPfI specifies that a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels identifies the potential for an unbalanced spectrum and potential increased annoyance.

Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 3.3 below.

Table 3.3 One-third octave low-frequency noise thresholds

	One-third octave $L_{Zeq,15\ minute}$ threshold level												
Frequency (Hz)	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
dB (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

The following modifying factor correction is to be applied where the site 'C-weighted' and site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 3.3 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 3.2 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB positive adjustment applies for the daytime period.

3.5 Sleep disturbance

The difficulty in establishing an absolute noise level criterion that would correlate to an acceptable level of sleep disturbance is acknowledged by relevant governing authorities.

The existing Tahmoor Mine operates during the night-time period (10 pm to 7 am) as will the TSP. Hence, an assessment of the potential for sleep disturbance is required. The INP Application Notes suggests that a site-related $L_{A1(1min)}$ or L_{Amax} level of 15 dB above the RBL is a suitable screening criterion for sleep disturbance for the night-time period.

The NPfI states that a detailed maximum noise level event assessment should be undertaken where the site's noise levels at a residential location exceed:

- $L_{Aeq,15min}$ 40 dB or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB or the prevailing RBL plus 15 dB, whichever is the greater.

Guidance regarding potential for sleep disturbance is also provided in the RNP. The RNP calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The RNP states the following conclusions from the research on sleep disturbance:

- maximum internal noise levels (L_{Amax}) below 50 to 55 dB are unlikely to awaken people from sleep; and

- one or two noise events per night, with maximum internal noise levels (L_{Amax}) of 65 to 70 dB, are not likely to affect health and wellbeing significantly.

It is commonly accepted by acoustic practitioners and regulatory bodies that the facade of a residential building of standard construction with a partially open window would reduce external noise levels by 10 dB. Therefore, external noise levels in the order of 60 to 65 dB L_{Amax} calculated at the facade of a residence are unlikely to cause awakening effects.

When assessing sleep disturbance, the L_{Amax} and $L_{A1,1min}$ descriptors may be interchanged. This is accepted by the EPA. If noise levels over the screening criteria are identified, then additional analysis would consider factors such as:

- how often the events would occur;
- the distribution of likely events across the night-time period;
- the existing ambient maximum noise events in the absence of the subject development; and
- current scientific literature available.

3.6 Construction noise

The Interim Construction Noise Guideline (ICNG) (DECC 2009) has been jointly developed by NSW Government agencies including the EPA and DPE. The objectives of the guideline relevant to the planning process are to promote a clear understanding of ways to identify and minimise noise from construction and to identify 'feasible' and 'reasonable' management and mitigation measures where required. The guideline recommends standard construction hours where noise from construction activities is audible at residential premises (ie assessment locations):

- Monday to Friday 7 am to 6 pm;
- Saturday 8 am to 1 pm; and
- No construction work is to take place on Sundays or public holidays.

The ICNG acknowledges that works outside standard hours may be necessary, however justification should be provided to the relevant authorities.

The DPE generally requires that noise emissions from construction associated with mining projects should be assessed under the INP. This is normally because noise from construction activity associated with such projects is similar in nature to that generated by the operation of the project particularly for open-cut mining operations. In the case of the TSP, construction activities (ie establishment of the new ventilation fans) will be different in nature to the operations. Further, the location of proposed construction activity is physically separated from typical operational activity. Thus, it is considered appropriate to apply construction noise criteria in accordance with the ICNG.

The ICNG provides two methodologies to assess construction noise emissions. The first is a quantitative approach, which is suited to major construction projects with a typical duration of more than three weeks. This method requires noise emission predictions from construction activities at the nearest assessment locations and assessment against ICNG recommended noise levels.

The second is a qualitative approach, which is a simplified assessment process that relies more on noise management strategies. This method is suited to short-term infrastructure and maintenance projects of less than three weeks.

The quantitative approach is appropriate for the proposed TSP construction and hence has been adopted for this assessment. Table 3.4 provides noise management levels for residential assessment locations which have been adopted for the quantitative construction noise assessment. Due to the significant separation distance between the construction sites and the non-residential assessment locations (ie school and church) potential construction noise impacts at these locations will be negligible.

Table 3.4 ICNG construction noise management levels for residential land uses

Time of day	Management level $L_{Aeq(15\ minute)}$	Application
Recommended standard hours: Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm, No work on Sundays or public holidays	Noise-affected RBL + 10 dB	The noise-affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq(15\text{-}min)}$ is greater than the noise-affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB	The highly noise-affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: i) times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences); ii) if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise-affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise-affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see Section 7.2.2 of the ICNG.

Source: ICNG (DECC 2009).

3.7 Road noise

Assessment of potential noise impact is required from the predicted increase in construction and operational related road traffic. The principle guidance for the assessment of road traffic noise impact on assessment locations is in the RNP. Traffic routes for construction and operational traffic related to the TSP consist of Remembrance Drive (north and south of the mine entrance), Rockford Road and Charlies Point Road. These are all categorised as either arterial or sub-arterial roads as per the categories provided in the RNP.

Table 3.5 presents the road traffic noise assessment criteria for noise sensitive receptors reproduced from Table 3 and Table 4 of the RNP for road categories relevant to the construction and operation of the TSP.

Table 3.5 Road traffic noise assessment criteria for residential land uses

Receiver type	Road category	Type of project/development	Assessment criteria – dB	
			Day (7 am to 10 pm)	Night (10 pm to 7 am)
Residence	Freeway/arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeway/arterial/sub-arterial roads generated by land use developments.	$L_{Aeq,15hr}$ 60 (external)	$L_{Aeq,9hr}$ 55 (external)
School	Any	Proposed road projects and traffic generating developments	$L_{Aeq,1hr}$ 40 (internal) when in use	-
Place of worship	Any	Proposed road projects and traffic generating developments	$L_{Aeq,1hr}$ 40 (internal) when in use	$L_{Aeq,1hr}$ 40 (internal) when in use

Additionally, the RNP states that where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2 dB.

In addition to meeting the assessment criteria (Table 3.5), any significant increase in total traffic noise at residential assessment locations must be considered. Assessment locations experiencing an increase in total traffic noise levels above those presented in Table 3.6 should be considered for mitigation.

Table 3.6 Road traffic relative increase criteria for residential land uses

Road category	Type of project/development	Total traffic noise level increase – dB	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Freeway/arterial/sub-arterial roads and transit ways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road.	Existing traffic $L_{Aeq(15\text{-}hr)}$ + 12 (external)	Existing traffic $L_{Aeq(9\text{-}hr)}$ + 12 (external)

3.8 Rail noise

The proposed development will transport product coal from Tahmoor Mine to Port Kembla via the existing mine rail load out, rail loop, the MSRL and the Moss Vale to Unanderra Railway. Transport of product coal from Tahmoor Mine to Newcastle may also occur from time to time.

Tahmoor Mine currently has four allocated train paths per day from ARTC for the rail network between the site and Port Kembla. This current allocation is equivalent to the transport of approximately 4 million tonnes of product coal per annum and is sufficient for the life of the TSP. A rail transport study has been undertaken for the proposed development, which indicates that the existing rail capacity will be sufficient for the proposed transport of product coal to Port Kembla under the proposed development. Hence no increase in rail capacity between Tahmoor Mine and Port Kembla will be required. As such, existing rail infrastructure and the number of allowable train movements will remain unchanged. Therefore, an assessment of off-site rail traffic noise is not considered necessary.

The existing onsite rail loop design is configured with two (2) radii of approximately 170 m and 200 m. The SEARs state that an assessment of rail "wheel squeal" is required for inclusion in the EIS. Wheel squeal from trains on the Tahmoor Mine rail loop has never been the subject of noise complaints. Further, investigations during onsite and off-site routine monitoring audits have not identified rail "wheel squeal" as a component of the noise from coal trains entering or leaving the rail loop. Locomotive engine noise has been identified as the major component contributing to noise from trains on the loop and has been incorporated into the operational noise model for the purpose of this assessment (refer Section 7.2).

3.9 Operational and construction vibration

3.9.1 Human comfort

i General discussion on human perception of vibration

Humans can detect vibration levels which are well below those causing any risk of damage to a building or its contents.

The actual perception of motion or vibration may not, in itself, be disturbing or annoying. An individual's response to that perception, and whether the vibration is "normal" or "abnormal", depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as "normal" in a car, bus or train is considerably higher than what is perceived as "normal" in a shop, office or dwelling.

Human tactile perception of random motion, as distinct from human comfort considerations, was investigated by Diekmann and subsequently updated in German Standard DIN 4150 Part 2 1975. On this basis, the resulting degrees of perception for humans are suggested by the vibration level categories given in Table 3.7.

Table 3.7 Peak vibration levels and human perception of motion

Approximate vibration level	Degree of perception
0.10 mm/s	Not felt
0.15 mm/s	Threshold of perception
0.35 mm/s	Barely noticeable
1.00 mm/s	Noticeable
2.20 mm/s	Easily noticeable
6.00 mm/s	Strongly noticeable
14.00 mm/s	Very strongly noticeable

Note: These approximate vibration levels (in floors of building) are for vibration having a frequency content in the range of 8 Hz to 80 Hz.

Table 3.7 suggests that people will just be able to feel floor vibration at levels of about 0.15 mm/s and that the motion becomes "noticeable" at a level of approximately 1 mm/s.

ii Vibration guideline

The NSW guideline for the assessment of vibration *Environmental Noise Management – Assessing Vibration: a technical guideline* (DEC 2006) (the guideline) is based on the British Standard BS 6472 – 2008, 'Evaluation of human exposure to vibration in buildings (1-80Hz)'.

The guideline presents preferred and maximum vibration values for the use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques. At vibration values below the preferred values, there is a low probability of adverse comment or disturbance to building occupants. Where all feasible and reasonable mitigation measures have been applied and vibration values are still beyond the maximum value, it is recommended that the operator negotiate directly with the affected community.

The guideline defines three vibration types and provides direction for assessing and evaluating the applicable criteria. Table 2.1 of the guideline provides examples of the three vibration types and has been reproduced in Table 3.8.

Table 3.8 Examples of types of vibration (from Table 2.1 of the guideline)

Continuous vibration	Impulsive vibration	Intermittent vibration
Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, eg occasional dropping of heavy equipment, occasional loading and unloading. Blasting is assessed using ANZECC (1990).	Trains, intermittent nearby construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer these would be assessed against impulsive vibration criteria.

Intermittent vibration (as defined in Section 2.1 of the guideline) is assessed using the vibration dose concept which relates to vibration magnitude and exposure time.

Intermittent vibration is representative of construction activities such as impact hammering, rolling or general excavation work.

Section 2.4 of the guideline provides acceptable values for intermittent vibration in terms of vibration dose values (VDV) which requires the measurement of the overall weighted root mean square (rms) acceleration levels over the frequency range 1 Hz to 80 Hz. To calculate VDV the following formula is used (refer to Section 2.4.1 of the guideline):

$$VDV = \left[\int_0^T a^4(t)dt\right]^{0.25}$$

Where VDV is the vibration dose value in $m/s^{1.75}$, *a (t)* is the frequency-weighted rms of acceleration in m/s^2 and *T* is the total period of the day (in seconds) during which vibration may occur.

The acceptable VDV for intermittent vibration are reproduced in Table 3.9.

Table 3.9 Acceptable vibration dose values for intermittent vibration – human comfort

Location	Daytime		Night-time	
	Preferred value, $m/s^{1.75}$	Maximum value, $m/s^{1.75}$	Preferred value, $m/s^{1.75}$	Maximum value, $m/s^{1.75}$
Critical areas	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Notes: 1. Daytime is 7 am to 10 pm and night-time is 10 pm to 7 am.

2. These criteria are indicative only, and there may be a need to assess intermittent values against continuous or impulsive criteria for critical areas.

There is a low probability of adverse comment or disturbance to building occupants at vibration values below the preferred values. Adverse comment or complaints may be expected if vibration values approach the maximum values. The guideline recommends that activities should be designed to meet the preferred values where an area is not already exposed to vibration.

It is expected that consideration of transient vibration provides a worst-case scenario in terms of potential human-comfort vibration impacts. Continuous vibration has not been considered given the transient nature of operations and the relative separation to vibration-sensitive receptors. Impulsive vibration as defined in Table 3.8 can be caused by blasting which is not applicable to the general operations or construction phase of the TSP.

3.9.2 Structural vibration

In terms of the most recent relevant vibration damage criteria, Australian Standard AS 2187.2 – 2006 'Explosives – Storage and Use – Use of Explosives' recommends that the frequency dependent guide values and assessment methods given in BS 7385 Part 2-1993 'Evaluation and measurement for vibration in buildings Part 2' be used as they are "applicable to Australian conditions".

The standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to be associated with a minimum risk of vibration induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

Sources of vibration that are considered in BS 7385 include demolition, blasting (carried out during mineral extraction or construction excavation), piling, ground treatments (eg compaction), construction equipment, tunnelling, road and rail traffic and industrial machinery.

The recommended limits (guide values) for transient vibration to manage minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in Table 3.10 and graphically in Figure 3.1.

Table 3.10 Transient vibration guide values for minimal risk of cosmetic damage

Line[1]	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s	50 mm/s
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Notes: Refers to the "Line" in Figure 3.1.

The BS 7385 notes that the guide values in Table 3.10 relate predominantly to transient vibration which does not give rise to resonant responses in structures and low-rise buildings.

Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table 3.10 may need to be reduced. Some construction activities (for example) are considered to have the potential to cause dynamic loading in some structures and therefore transient values in Table 3.10 have been reduced by 50% for assessment purposes, with a vibration screening criterion set at 7.5 mm/s.

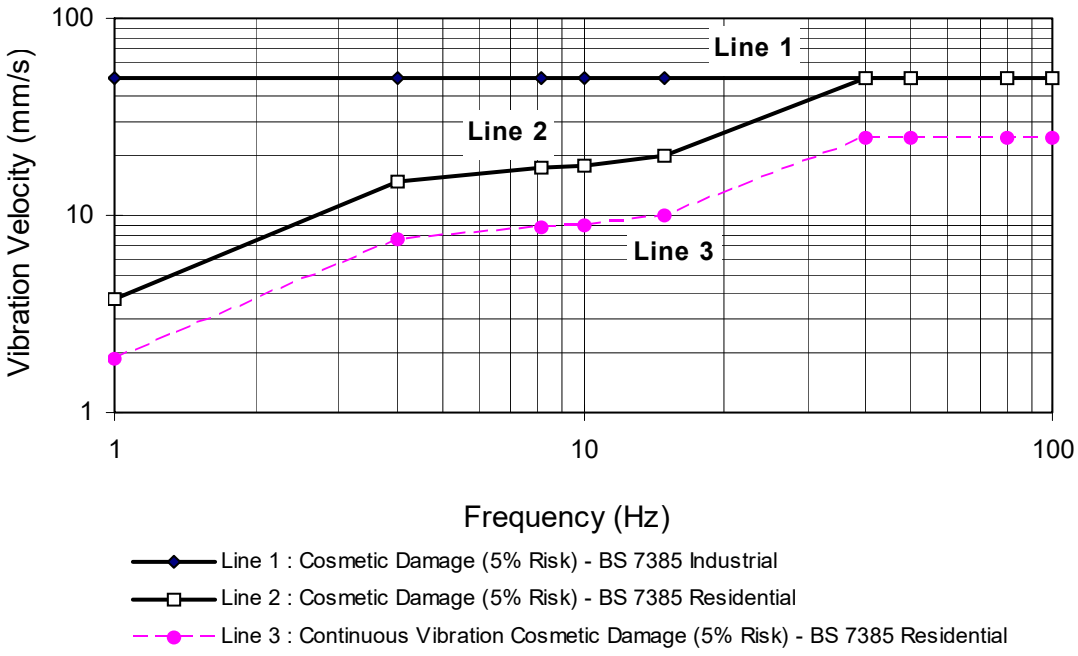


Figure 3.1 Graph of transient vibration guide values for cosmetic damage

In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the guide values for building types corresponding to Line 2 are reduced. Below a frequency of 4 Hz where a high displacement is associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz (as shown in Figure 3.1).

Fatigue considerations are also addressed in BS 7385 which concludes that unless calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the guide values in Table 3.10 should not be reduced for fatigue considerations.

In order to assess the likelihood of cosmetic damage due to vibration, AS 2187 specifies that vibration measured should be undertaken at the base of the building and the highest of the orthogonal vibration components (transverse, longitudinal and vertical directions) should be compared with the criteria curves presented in Table 3.10.

It is noteworthy that in addition to the guide values nominated in Table 3.10, BS 7385 states that:

> Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK.

Also that:

> A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.

4 Existing mine noise

4.1 Existing noise criteria

The most recent development consent relating to existing operations at Tahmoor Mine with respect to noise criteria is the 1994 development consent. The noise conditions imposed by the 1994 consent are set out in conditions 73 and 74 of the Talbot J's judgement in Kembla Coal & Coke Pty Limited v Wollondilly Shire Council (1994) NSWLEC 99 (7 September 1994). The approval states the following:

> Condition 73. The noise level emanating from Tahmoor Mine and any associated facilities, including the washery, stock pile area and rail loading facility, shall not exceed an L10 level of 45dBA when measured within 3 m of any residence.
>
> Condition 74. The noise emanating from operations at the refuse emplacement site shall not exceed an L10 of 37dBA or background +5dBA whichever is the greater when measured 3 m of any residence.

It is of note that the development consent does not contain any maximum noise event criteria for the night-time. Further, residential dwellings have been approved and built nearer to the mine than those that already existed at the time of the 1994 consent.

Environment Protection Licence (EPL) 1389 does not contain any noise limits relevant to the site nor any requirement to monitor noise emissions. However, it has previously included a number of Pollution Reduction Programs (PRPs) which are described in more detail in the following section.

4.2 Existing noise mitigation and management measures

Noise mitigation and management measures that are currently implemented at the site include the following:

- enclosure of acoustically significant fixed plant such as the CHPP, transfer and processing buildings and conveyor galleries;
- broadband reversing alarms on all surface mobile equipment;
- acoustic barriers such as the earth bund adjacent the rail loop and on the western side of the clean coal stockpile area; and
- concrete coal storage bins.

EPL 1389 for Tahmoor Mine has also included a number of PRPs with the aim of reducing noise emissions from the site. The completed noise related PRPs are summarised as follows:

- PRP12 – Noise Assessment Survey – Completed 31 March 2007;
- PRP13 – Stage 2 Noise Investigation and Mitigation Program – Completed 31 January 2009;
- PRP14 – Noise Mitigation Program – Completed 31 December 2009;
- PRP16 – Noise Survey Review and Assessment – Completed 30 May 2011;
- PRP17 – Review of Noise Mitigation Works – Completed 29 July 2011; and

- PRP 18 – Feasible and Reasonable Noise Mitigation Works – Completed 29 September 2011.

Works associated with the PRPs have been implemented and completed to the EPA's requirements. Noise mitigation works undertaken as part of PRPs included the following:

- use of a Programmable Logic Controller (PLC) to control the operation of the main surface shaker screen at the CHPP;
- GPS tracking installed in REA haul trucks to monitor speed and truck movements;
- a real-time noise monitoring network and alarm reporting system;
- secondary acoustic treatments to the Vent Shaft 2;
- decommissioning of the Shaft 3 ventilation system;
- acoustic treatments to the head of the drift conveyor to reduce product impact airborne noise and vibration transfer;
- dampening of product deflector plates, external insulation and cladding of the reject bin; and
- replacement of building cladding and closing of openings in buildings.

Other works implemented as a result of the PRPs specifically targeted at reducing maximum noise events from the site include the following:

- laminated transfer chutes at conveyor transfer points;
- lagging of the reject stone bin;
- limit switches to ensure the stone bin levels are maintained at not less that 30% full;
- replacement of mobile plant reversing alarms with low level, broad-spectrum alarms (colloquially referred to as "quackers"); and
- installation of an onsite real-time noise monitor.

In September 2011 Tahmoor Coal reported to the EPA that Pollution Reduction Program 18 (Noise Mitigation Works) had been completed. Correspondence from the EPA (4 February 2013) confirmed that noise from Tahmoor Mine (banging, crashing and reversing alarms) had been reduced compared with monitoring conducted in 2007.

Noise at the mine is monitored through quarterly attended night-time surveys, and by the two continuous real-time noise monitors which operate 24 hours per day 7 days per week. The continuous real-time noise monitor located onsite has been programmed with pre-defined alarm trigger levels, which are linked to the site's control room and Citect control system, for monitoring night-time operational noise. The system (detailed in the site document TAH SD PRO 0008 Noise Alarm Procedure & TARP) allows the site to proactively manage noise levels during night-time hours, with the intent of managing identified elevated noise levels as they occur, ultimately reducing the number of community complaints.

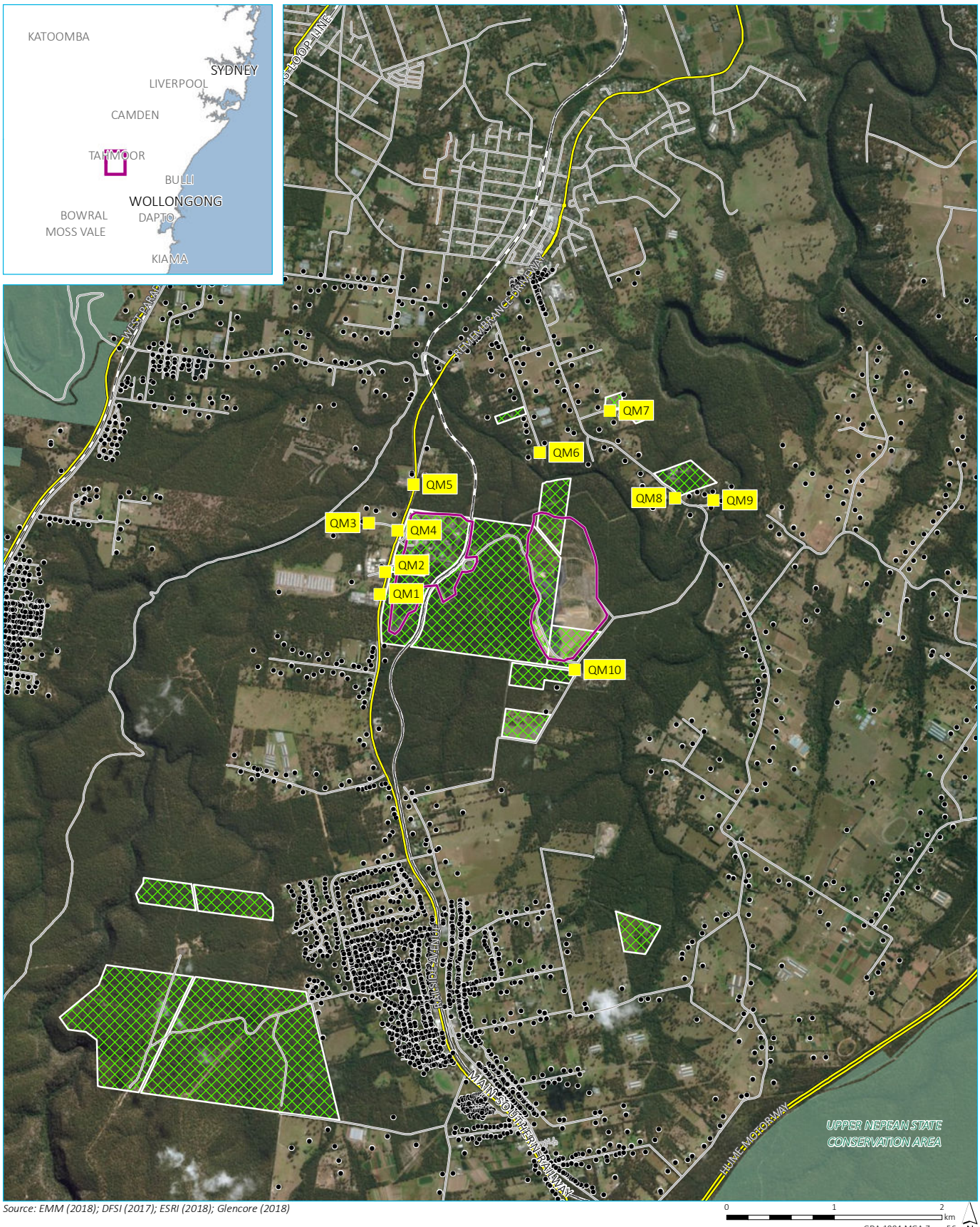
Data from the quarterly attended noise monitoring reports are reviewed against the site's noise criteria to assess compliance with the conditions of consent. Noise level data and audio recordings from the two real-time monitors are also used to verify compliance with noise criteria (and conditions of consent), particularly in response to community complaints or other specific enquiries or investigations.

All incidents, non-compliances and exceedances are dealt with in accordance with the Tahmoor Environmental Management System Framework (TAHUG-502308417-6540) Document.

4.3 Existing noise emissions

The noise impact assessment for the original development application was prepared prior to the INP. A very different assessment methodology was utilised including the use of different noise parameters and it excluded the requirement to consider the effects of meteorological conditions on noise emissions. Hence, compliance noise monitoring has typically occurred during calm weather conditions.

A summary of the quarterly noise monitoring results, as provided in the quarterly reports, for the period between Q1 2014 and Q1 2018 (ie 17 rounds of monitoring) is shown in Table 4.1 together with the criteria applicable at each location. It is noted that noise criteria do not apply at some of the monitoring locations since they are not noise-sensitive receptors. Monitoring locations are shown in Figure 4.1.



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

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GDA 1994 MGA Zone 56

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KEY

- Tahmoor-owned land
- Assessment location
- Existing quarterly noise monitoring location (EMM)
- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

Existing quarterly noise monitoring locations

Tahmoor South Project
Noise impact assessment
Figure 4.1

EMM
creating opportunities

Table 4.1 Summary of quarterly noise compliance monitoring reports

Date (dd/mm/yy)	Operations	Estimate L_{A10} site contribution									
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
20/02/14	CPP fully operational. Dozer operating on the clean stockpile, train loading, impact noise from 2A-1F transfer building and transportation of material to the refuse area.	<48	<60	<45	<47	<47	<38	<35	<35	<35	<32
12/05/14	CPP fully operational. Washery building, dozer on clean stockpile, impact noise from 2A-1F transfer building.	<48	47	<42	<45	<40	<30	<30	<32	<30	<30
14/07/14	CPP operational. No trains. Washery, conveyors, coal falling on ROM stockpile and clean coal stockpile, dozer operating near clean coal stockpile.	<52	<53	<48	<48	<40	<30	<30	<33	<30	<30
29/10/14	CPP operational without coal. Train onsite. Dozer in reclaim area, vacuum pumps, co-gen plant, Shaft #2 vent system.	<50	<54	<47	<52	<46	40/ 41	35/ 36	32/ 33	<30	<30
11/02/15	CPP conveyors operational, washery shutdown at 2250. Conveyors, vacuum pumps, co-gen plant, shaft #2 vent system.	<46	<47	<42	<47	<42	40/ 41	<35	<34	<30	<36
23/06/15	CPP conveyors and washery operational. Conveyors, vacuum pumps, co-gen plant, shaft #2 vent system, dozer on clean stockpile.	54/ 55	55/ 56	44/ 45	47/ 48	<42	39/ 40	<30	<35	<30	<35
20/08/15	Washery and clean stockpile conveyors operational. Conveyors, vacuum pumps, co-gen plant, washery, shaft #2 vent sys, truck refuse service road, dozer at clean stockpile.	<50	<50	44/ 45	<45	<40	<35	<30	<33	<30	<30
19/10/15	CPP not operating, dozer working in clean coal stockpile. Vacuum pumps, co-gen plant, shaft #2 vent system, dozer.	<50	<50	<40	<40	<40	<35	<30	<30	<30	<35
11/02/16	CPP operating, dozer working in clean coal stockpile. CPP, vacuum pumps, co-gen plant, shaft #2 vent system, truck transporting product to refuse area, dozer.	<55	<50	<45	<45	<45	<35	<30	<30	<30	<35
19/04/16	CPP, vacuum pumps, co-gen plant, shaft #2 vent system and transporting product to refuse area.	<45	<46	<45	<46	<45	<40	<35	<40	<35	<35
16/08/16	CHPP, vacuum pumps, co-gen plant, dozer working clean coal stockpiles, shaft #2 vent systems, transporting product to refuse area.	53/ 54	53/ 54	<45	<48	<45	<40	<35	<35	<35	<45
3/11/16	CHPP, vacuum pumps, co-gen plant, dozer working clean coal stockpiles, shaft #2 vent systems, transporting product to refuse area.	50/ 51	55/ 57	<47	<50	<45	<40	<35	<35	<35	<45
20/02/17	vacuum pumps, co-gen plant, dozer working clean coal stockpiles and conveyors	54/ 55	56/ 57	<47	<50	<45	<40	<35	<37	<35	<35
1/05/17	Truck on private haul road (REA), #2 shaft vent system, dozer working clean coal stockpiles, falling coal, ROM transfer building 2A-1F and conveyors.	53/ 54	52/ 53	<45	<50	<40	<40	<35	<37	<35	<35

Table 4.1 Summary of quarterly noise compliance monitoring reports

Date (dd/mm/yy)	Operations	Estimate L_{A10} site contribution									
		M1	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**
11/09/17	REA haul truck, #2 shaft ventilation system, dozer working the ROM stockpile, falling coal clean coal stockpile, washery, transfer building 2A-1F and conveyors.	48/ 49	48/ 49	<42	<45	<35	<35	<35	<35	<35	<35
15/11/17	CPP fully operational. Dozer operating on the clean stockpile, train loading, impact noise from 2A-1F transfer building and transportation of material to the refuse area.	<48	<60	<45	<47	<47	<38	<35	<35	<35	<32
29/01/18	CPP fully operational. Washery building, dozer on clean stockpile, impact noise from 2A-1F transfer building.	<48	47	<42	<45	<40	<30	<30	<32	<30	<30
	Noise criteria (Tahmoor mine)	**n/a**	**n/a**	**45**	**n/a**	**45**	**45**	**45**	**45**	**45**	**n/a**
	Noise criteria (refuse emplacement area)	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**37**	**37**	**37**	**37**	**n/a**

Source: various quarterly noise monitoring reports prepared by Atkins Acoustics Pty Ltd. The numbers shown here are as they are reported in the various quarterly monitoring reports.

Results of quarterly noise monitoring surveys indicate that noise levels are generally in compliance with the existing noise limits (ie within 2 dB) at the relevant residential monitoring locations. Results also show that existing mine noise emissions from site at the eastern end of Olive Lane (M4) are in the order of 47 to 50 dB[2] during calm conditions.

Measured night-time L_{Aeq} one-third octave band centre frequency levels (10-160 Hz), LFN threshold levels (NPfl) and C-A weighted levels for the November 2017 and January 2018 attended noise monitoring periods are shown in Table 4.2 and Table 4.3. These results indicate that low frequency noise above the current relevant NPfl thresholds is present in the vicinity of Olive Lane (locations M3 and M4) and the Wollondilly Anglican Church and College (location M2). Levels marginally above the relevant thresholds were also measured in the vicinity of the existing ventilation shaft (T2) (location M8) during the January survey only. It is not expected that this marginal exceedance was due to operation of the ventilation fan alone since it only occurred during one of the surveys.

[2] It was not possible to accurately determine site contribution as levels were reported as "less than" a number.

Table 4.2 Attended night L_{eq} one-third octave band (10-160 Hz) results – January 2018

Frequency, Hz	Threshold level, dB	Z-weighted) noise levels, dB									
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
C-A weighted		24	24	22	24	22	20	18	27	18	24
10	92	66	67	64	67	65	68	68	79	73	64
12.5	89	77	80	69	74	68	66	65	77	69	66
16	86	80	82	74	77	75	66	62	68	63	68
20	77	60	63	59	61	58	57	56	68	64	53
25	69	75	75	65	72	59	56	54	64	56	59
31.5	61	77	77	70	72	62	57	48	57	49	59
40	54	65	68	62	63	48	44	42	55	44	43
50	50	59	63	56	56	46	47	47	52	41	39
63	50	59	58	53	56	48	40	36	44	33	35
80	48	53	56	51	51	41	39	31	51	32	34
100	48	51	53	46	49	40	34	28	40	32	32
125	46	45	46	43	47	37	31	27	40	28	31
160	44	45	46	41	46	36	30	26	31	31	29

Notes: 1. Levels shaded exceed the NPfI threshold by up to 5 dB for the relevant third-octave band centre frequency.
2. Levels shaded and underlined exceed the NPfI threshold by more than 5 dB for the relevant third-octave band centre frequency.

Table 4.3 Attended night L_{eq} one-third octave band (10-160 Hz) results – November 2017

Frequency, Hz	Threshold level, dB	Z-weighted) noise levels, dB									
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
C-A weighted		18	20	21	19	26	20	16	27	27	29
10	92	70	70	64	67	63	67	67	79	72	64
12.5	89	77	79	68	74	69	65	70	76	69	68
16	86	79	82	73	77	76	68	64	68	63	70
20	77	60	63	57	61	59	53	59	66	41	52
25	69	72	72	61	68	58	55	58	63	55	60
31.5	61	73	73	64	68	59	55	54	56	49	60
40	54	63	66	57	58	47	44	53	52	42	45
50	50	55	61	52	52	43	40	50	48	36	41
63	50	50	56	46	49	41	37	46	41	32	37
80	48	57	60	46	49	35	38	42	41	34	39
100	48	58	61	44	52	35	31	37	39	28	38
125	46	46	48	40	48	32	27	44	35	23	28
160	44	51	49	37	46	30	25	40	28	23	25

Notes: 1. Levels shaded exceed the NPfI threshold by up to 5 dB for the relevant third-octave band centre frequency.
2. Levels shaded and underlined exceed the NPfI threshold by more than 5 dB for the relevant third-octave band centre frequency.

4.4 Complaints history

Figure 4.2 provides a summary of the number of community complaints in comparison to previous years sourced from the *Tahmoor Underground 2017 Annual Review*. The complaints history summary shows a strong downward trend since 2010. Notably, this reduction in noise complaints coincides with the completion of PRPs, and therefore is evidence that implementation of the PRPs at Tahmoor Mine has been successful in reducing noise emissions from the mine. As described in Section 4.2, noise mitigation works were completed in December 2009, with the further works completed in September 2011.

We understand that most of the complaints received in recent years have been related to noise and forwarded from the EPA after being received from a single resident on Olive Lane.

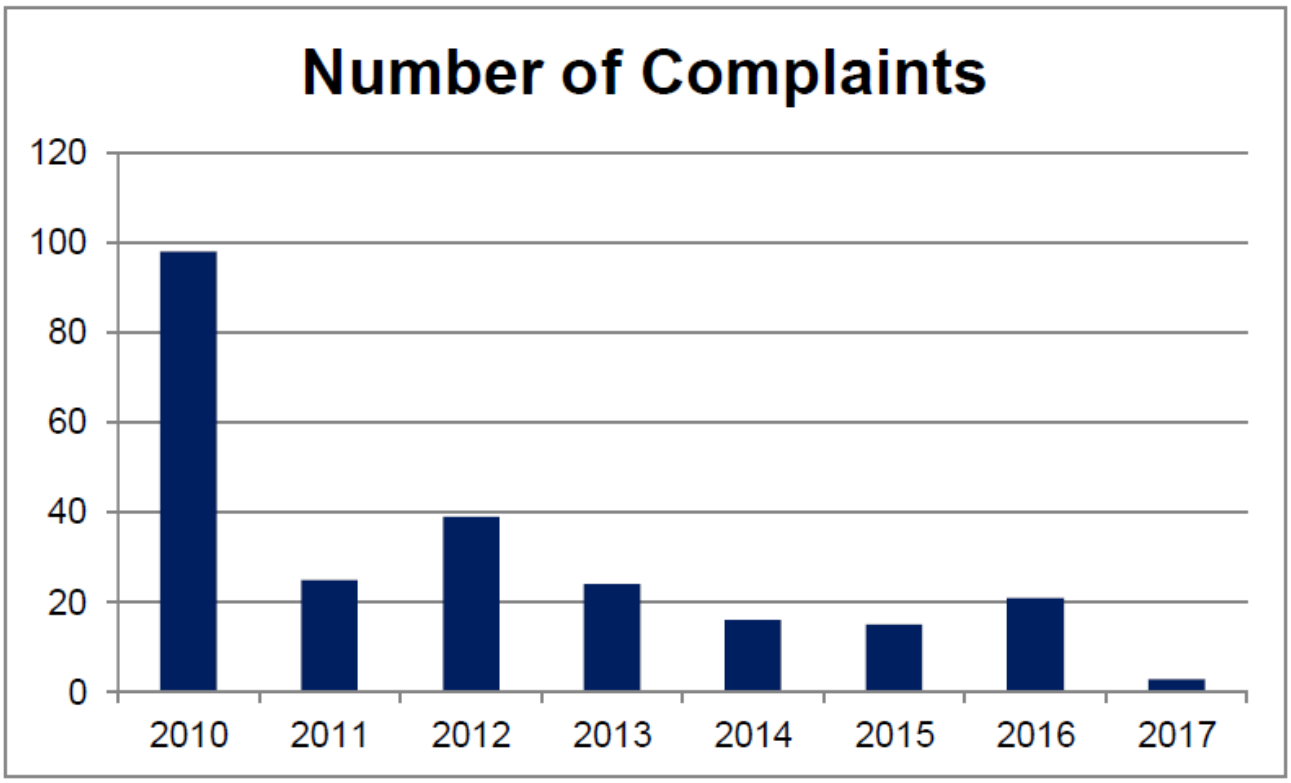


Figure 4.2 Tahmoor Mine complaints history

5 Existing acoustic environment

5.1 Site description and assessment locations

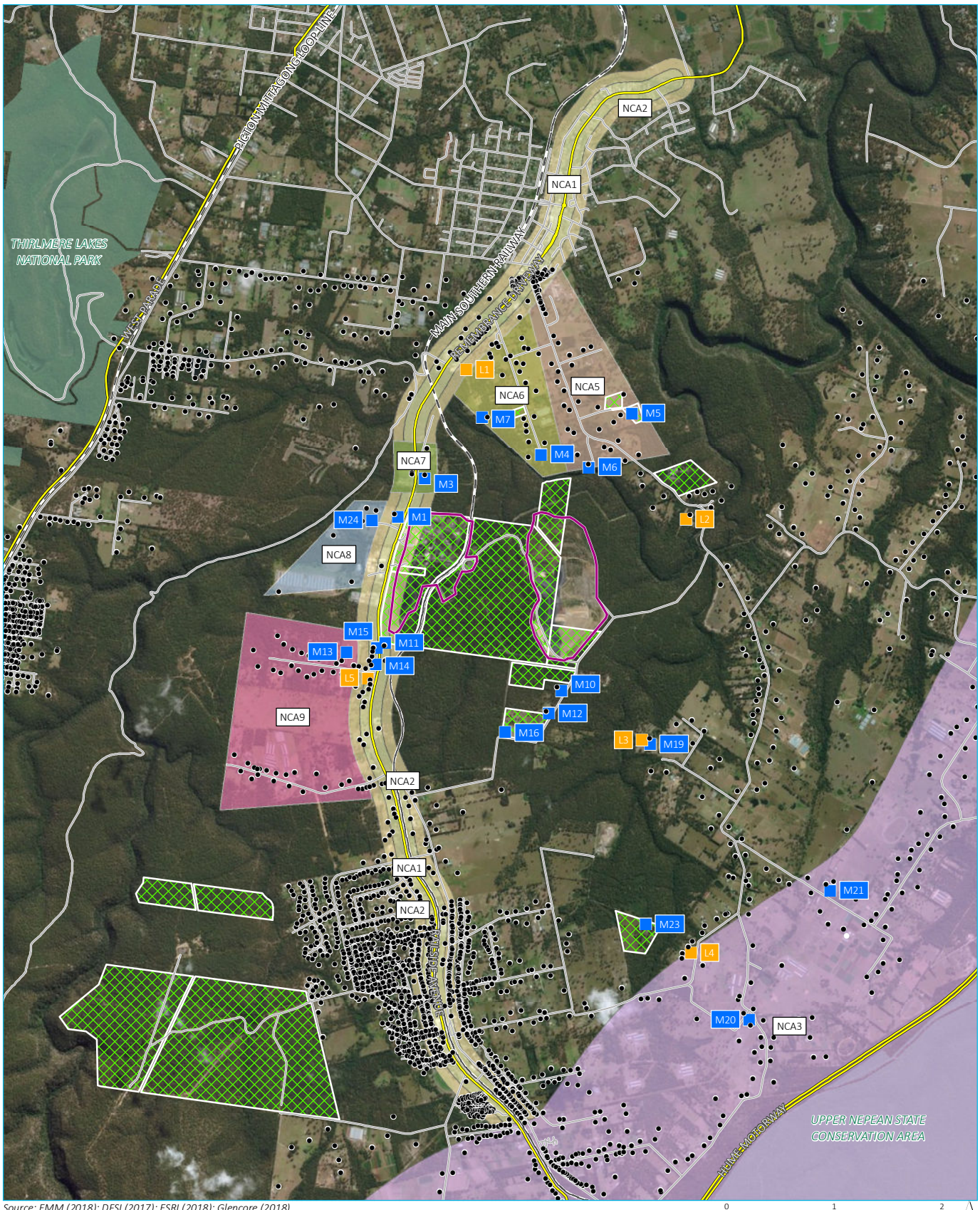
The Project Area for the proposed development is generally bounded by the Bargo and Nepean Rivers to the north, West Parade and the Picton-Mittagong Railway to the west, the Nepean River, Metropolitan Special Area (MSA) and Upper Nepean State Conservation Area to the east, and Crown land and the M31 Hume Motorway to the south. The mine infrastructure at the surface facilities area is surrounded by vegetated land and gullies, bounded by Remembrance Driveway to the west and bisected by the Main Southern Railway.

The Project Area extends beneath semi-rural and partly forested landscapes, along with a mix of rural and environmental land uses. The Project Area is located in a region with a long history of agricultural use. Rural uses within the Project Area include small-scale agricultural activities such as poultry, cattle grazing, trotting horse training, greyhound training and several horse studs.

The Project Area extends under the residential, semi-rural and agricultural areas of the villages of Buxton, Bargo and Balmoral. The surface facilities area is located approximately 3 km south of Tahmoor and 3.5 km north of Bargo.

For the assessment of noise from the existing mining operations and the TSP, consideration has been given to the existing quarterly noise compliance monitoring locations (M1 to M10). Further, private dwellings (houses) and other noise-sensitive developments (eg Anglican Church and College) have been identified near the site and are referred to in this report as assessment locations. Assessment locations have been categorised in nine noise catchment areas (NCA) based on similar ambient acoustic environments. These catchment areas are described further in Section 6.1.

Assessment locations and the relevant NCA are shown in Figure 5.1.



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

0 1 2 km

GDA 1994 MGA Zone 56

N

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KEY

- Tahmoor-owned land
- Assessment location
- Noise logger (EMM)
- Previous noise loggers (Atkins 2012)
- Mine site
- Rail line
- Main road
- Local road
- NPWS

Noise catchment area

- NCA1
- NCA2
- NCA3
- NCA4 (all other; typically rural land)
- NCA5
- NCA6
- NCA7
- NCA8
- NCA9

Assessment locations and NCA

Tahmoor South Project
Noise impact assessment
Figure 5.1

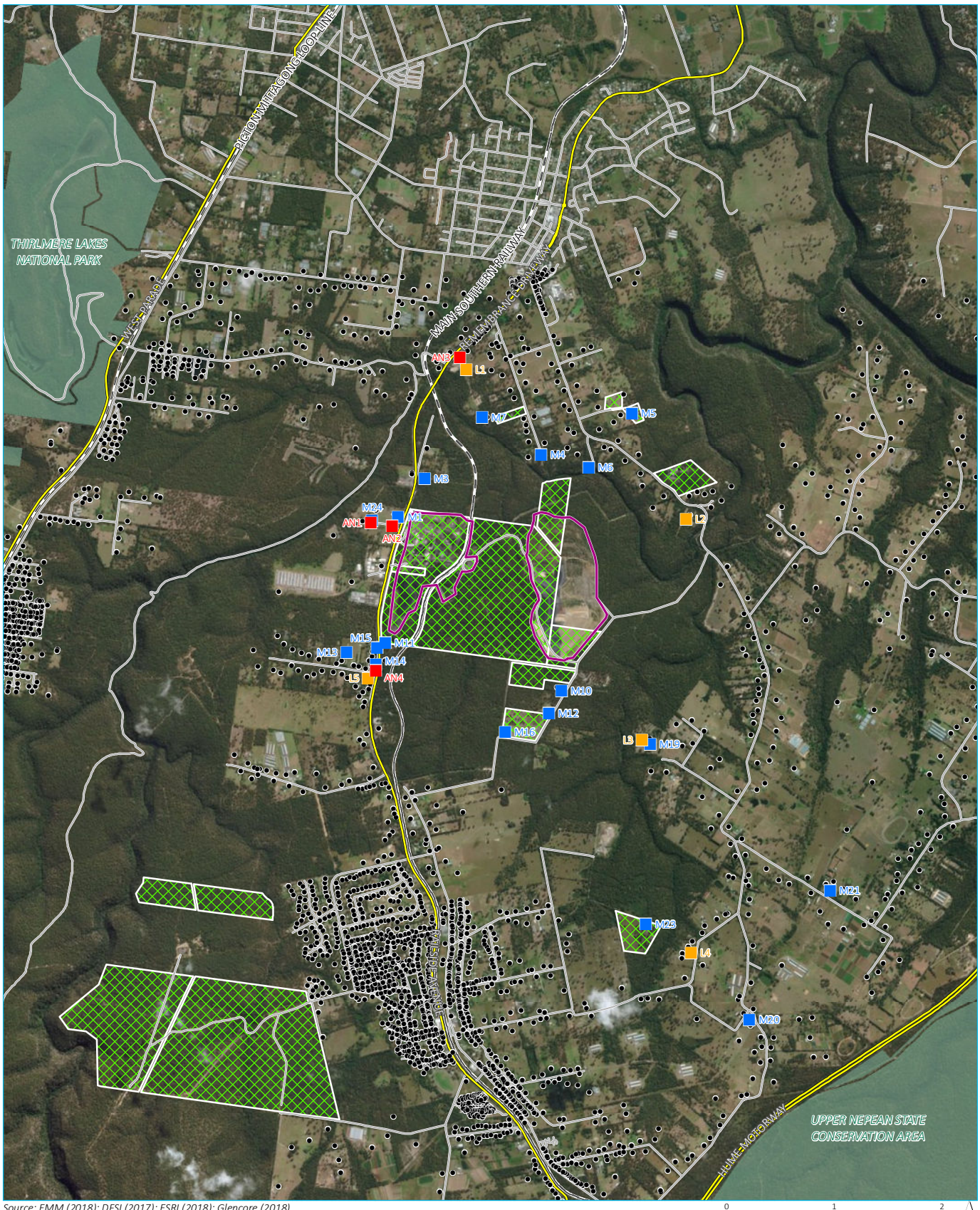
EMM
creating opportunities

5.2 Existing ambient noise levels

A key element in assessing environmental noise impact from industry is to quantify the existing background noise environment, including any existing industrial noise where present. Figure 5.2 provides the location of all relevant long-term noise logger and short-term operator-attended noise monitoring locations.

Unattended noise monitoring was completed by EMM at five locations surrounding the site in May 2018. The noise loggers were in place from 16 to 29 May 2018 and were programmed to record statistical noise level indices continuously in 15-minute intervals. Calibration of each noise logger was checked prior to and following unattended noise monitoring. Drift in calibration did not exceed ±0.5 dB. The equipment carried appropriate and current NATA calibration certificates. Weather data for the unattended noise monitoring period was recorded with a mobile weather station located with the noise logger at location L2. The wind speed and the rainfall data were used to exclude noise data during periods of any rainfall and/or wind speeds in excess of 5 m/s (approximately 9 knots) in accordance with methodology provided in the Industrial Noise Policy (INP) (EPA, 2000).

A summary of the background and ambient noise monitoring results is provided in Table 5.1. Detailed graphs of the data obtained by EMM are provided in Appendix A.



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

0 1 2 km

GDA 1994 MGA Zone 56

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KEY

- Tahmoor-owned land
- Assessment location
- Noise logger (EMM)
- Operator-attended noise monitoring location (EMM)
- Previous noise loggers (Atkins 2012)
- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

Ambient-noise monitoring locations

Tahmoor South Project
Noise impact assessment
Figure 5.2

EMM creating opportunities

Results of previous unattended noise monitoring undertaken by Atkins Acoustics in 2012 are also provided in Table 5.1. Monitoring undertaken by Atkins Acoustics incorporated periods when the mine was operational as well as when mining operations were limited (ie CHPP was not operating; operating plant during this time included the gas plant, co-generation plant, compressors and ventilation systems). Results are provided for the limited operational scenario unless stated otherwise. At times, lower noise levels were recorded with the mine operating compared to when mining operations were limited. This could indicate that mining operations are not the main contributor at these locations and/or that other noise sources were the main contributors during the monitoring period. It could be expected that ambient noise levels vary by +/- 3 dB due to normal variations in the ambient acoustical environment.

Table 5.1 Summary of existing background and ambient noise

Monitoring location	Period[1]	RBL[2], dB	Measured $L_{Aeq, period}$ noise level[3], dB
L1 2775 Remembrance Drive, Tahmoor (Ngara s/n: 878113)	Day	39	49
	Evening	37	47
	Night	30	46
L2 280 Rockford Road, Tahmoor (SVAN 979 s/n: 21095)	Day	30	44
	Evening	30	40
	Night	27	38
L3 70 Warrobyn Road, Bargo (SVAN 977 s/n: 59681)	Day	28	42
	Evening	31	39
	Night	29	38
L4 255 Bargo Road, Bargo (ARL 316 s/n: 16-207-005)	Day	33	51
	Evening	34	45
	Night	30	41
L5 3100 Remembrance Drive, Bargo (ARL 316 s/n: 16-207-030)	Day	44	59
	Evening	37	52
	Night	30	50
M1 2 Olive Lane, Bargo	Day	45 (45 with mine)	57 (56 with mine)
	Evening	42 (45 with mine)	56 (55 with mine)
	Night	33 (40 with mine)	53 (53 with mine)
M2 4 Olive Lane, Bargo	Day	41 (42 with mine)	50 (51 with mine)
	Evening	40 (44 with mine)	49 (50 with mine)
	Night	32 (38 with mine)	46 (47 with mine)
M3 2897 Remembrance Drive, Bargo	Day	41 (42 with mine)	53 (55 with mine)
	Evening	37 (38 with mine)	53 (53 with mine)
	Night	34 (36 with mine)	47 (49 with mine)
M4 130 Stratford Road, Tahmoor	Day	34 (31 with mine)	47 (43 with mine)
	Evening	32 (31 with mine)	41 (46 with mine)
	Night	33 (34 with mine)	45 (42 with mine)
M5 7 Hodgson Grove, Tahmoor	Day	32 (32 with mine)	55 (44 with mine)
	Evening	<30 (<30 with mine)	42 (42 with mine)
	Night	<30 (<30 with mine)	39 (39 with mine)
M6 20 Dietrich Road, Tahmoor	Day	32 (30 with mine)	51 (43 with mine)
	Evening	<30 (30 with mine)	64 (40 with mine)
	Night	<30 (30 with mine)	44 (40 with mine)

Table 5.1 Summary of existing background and ambient noise

Monitoring location	Period[1]	RBL[2], dB	Measured $L_{Aeq, period}$ noise level[3], dB
M7 84 Stratford Road, Tahmoor	Day	34 (33 with mine)	54 (46 with mine)
	Evening	32 (32 with mine)	45 (44 with mine)
	Night	32 (33 with mine)	51 (42 with mine)
M10 215 Charlies Point Road, Bargo	Day	34 (31 with mine)	47 (43 with mine)
	Evening	33 (32 with mine)	47 (43 with mine)
	Night	32 (33 with mine)	42 (41 with mine)
M11 3085 Remembrance Drive, Bargo	Day	41 (40 with mine)	55 (57 with mine)
	Evening	34 (36 with mine)	54 (54 with mine)
	Night	32 (32 with mine)	52 (51 with mine)
M12 185 Charlies Point Road, Bargo	Day	32 (32 with mine)	56 (46 with mine)
	Evening	30 (31 with mine)	42 (43 with mine)
	Night	31 (30 with mine)	41 (46 with mine)
M14 3092 Remembrance Drive, Bargo	Day	44 (43 with mine)	63 (62 with mine)
	Evening	36 (35 with mine)	60 (60 with mine)
	Night	31 (<30 with mine)	57 (56 with mine)
M15 3076 Remembrance Drive, Bargo	Day	44 (43 with mine)	66 (65 with mine)
	Evening	34 (35 with mine)	65 (63 with mine)
	Night	32 (<30 with mine)	60 (59 with mine)
M16 115 Charlies Point Road, Bargo	Day	31 (30 with mine)	50 (48 with mine)
	Evening	30 (<30 with mine)	56 (42 with mine)
	Night	<30 (<30 with mine)	46 (40 with mine)
M19[4] 70 Warrobyn Road, Bargo	Day	<30 with mine	50 with mine
	Evening	30 with mine	44 with mine
	Night	<30 with mine	44 with mine
M20[4] 70 Hinkler Road, Bargo	Day	38 with mine	52 with mine
	Evening	39 with mine	52 with mine
	Night	35 with mine	47 with mine
M21[4] 105 Dwyers Road, Bargo	Day	35 with mine	55 with mine
	Evening	38 with mine	50 with mine
	Night	33 with mine	46 with mine
M23[4] 125 Anthony Road, Bargo	Day	37 with mine	51 with mine
	Evening	35 with mine	41 with mine
	Night	33 with mine	40 with mine

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am.

2. The RBL is an INP term and is used represent the background noise level.

3. The energy averaged noise level over the measurement period and representative of general ambient noise.

4. Results for these locations have been provided only for the scenario where the mine is operational however, given the separation distance to these locations, operation of the mine is not expected to influence ambient noise levels here.

Operator-attended noise monitoring was also completed by EMM at the five EMM logger locations and at offsite locations surrounding the site (refer Figure 5.12). A summary of the attended noise monitoring results is provided in Table 5.2. These surveys were undertaken using a Brüel & Kjær 2250 Type 1 sound analyser (serial number 2759405).

Table 5.2 Summary of attended noise monitoring results

Monitoring location	Date Start time	Time	Total measured noise levels (dB)			Site noise contribution, L_{Aeq} (dB)	Comments
			L_{Aeq}	L_{A90}	L_{Amax}		
L1	16/5/18	16:00	46	41	66	<38	Traffic on Remembrance Dr dominant. Activity at Picton Power Lines site. Occasional dog bark and wind in trees. Train on main line. Tahmoor mine (dozer) just audible.
L5	16/5/18	16:45	58	49	77	IA	Local resident activity, sheep bleating, passenger train on main line, traffic on Remembrance Drive, dog barking. Tahmoor mine not audible.
L4	16/5/18	17:30	46	42	61	IA	Distant road traffic noise constant, dog barking, local resident activity, local traffic. Tahmoor mine not audible.
AN1	16/5/18	22:15	46	43	58	44	Tahmoor site noise dominant (CHPP hum and conveyors) as well as traffic on Remembrance Drive. Tahmoor mine noise constant – no maximum noise events.
AN2	16/5/18	22:45	53	49	66	50	Tahmoor site noise dominant (CHPP hum and conveyors) as well as traffic on Remembrance Drive. Tahmoor mine noise generally constant – train loading up to 53.
AN3	16/5/18	23:14	48	34	73	36	Constant hum from Tahmoor mine, haul truck audible in REA, traffic on Remembrance Drive.
AN4	16/5/18	23:50	50	31	69	IA	Train on main line, dogs barking and traffic on Remembrance Drive. Tahmoor mine not audible.
L2	17/5/18	9:45	39	30	55	<20	Distant aeroplanes, local residence activity, birds, traffic on Rockford Rd. Hum from Tahmoor mine just barely audible in lulls.
L3	17/5/18	12:15	37	30	68	<30	Animals (sheep and dogs), dozer in REA just audible, birds, breeze in trees.

1. Weather during daytime operator-attended noise surveys (Locations L1-L5) was generally calm with some gusts of varying directions up to 2m/s at microphone height with some cloud cover and no rainfall.
2. Weather during the night-time surveys was generally calm, less than 1m/s from SE, at microphone height with no cloud cover or rainfall.

The existing noise environment west of the site, in Olive Lane, is dominated by noise from Tahmoor mine and traffic on Remembrance Drive. North of the site the existing noise environment is dominated by local traffic and some commercial activity with some contribution from Tahmoor mine. Noise levels at residences south of the site are dominated by traffic noise from Remembrance Drive and trains. Noise levels in residential areas west of the site are dominated by typically rural sounds and local traffic.

5.3 Meteorology

During certain weather conditions, mine noise emissions at the assessment locations may increase or decrease compared with noise during calm conditions. This is due to refraction caused by the varying speed of sound with increasing height above the ground that occurs during winds or where air temperature changes with height. A simple yet conservative approach has been selected for the consideration of potentially noise-enhancing weather conditions in accordance with Section 5 of the INP. Noise emissions from site have been predicted for both calm and worst-case noise-enhancing conditions as provided in Table 5.3.

Table 5.3 Modelled meteorological parameters

Assessment condition	Period	Temperature	Wind speed / Direction	Relative humidity	Stability Class
Calm	Day	20°C	n/a	70%	D
	Evening / Night	10°C	n/a	90%	D
Noise-enhancing	Day	20°C	3m/s Source to receiver	70%	D
	Evening / Night	10°C	2m/s Source to receiver	90%	F

This provides a conservative approach since the noise emissions predicted under noise-enhancing conditions are expected to represent the upper range of noise emissions from the mine.

6 Operational noise criteria

6.1 Project specific noise levels

6.1.1 Intrusiveness

The intrusiveness criteria require that $L_{Aeq,15min}$ noise levels from site during the relevant operational periods (ie day, evening and night) do not exceed the relevant RBL by more than 5 dB. It is noted that where the RBL for the evening or night period is higher than day period RBL, the lower RBL for the day period has been adopted as the evening and night period RBLs in accordance with the INP Application Notes. The RBLs utilised for determination of the intrusive criteria are based on the background noise monitoring results presented in Table 5.1 as follows:

- NCA1: this is the area located within 100m from Remembrance Drive and is represented by the ambient noise levels recorded at L5 which was located 70 m from Remembrance Drive. It is noted that ambient noise levels measured here were generally consistent (within 2 dB) with those measured at other similar locations by Atkins Acoustics (ie M11, M14 and M15).

- NCA2: this is the area located within 200m from Remembrance Drive and is represented by the ambient noise levels recorded at L1.

- NCA3: this is the area located south-east of the mine toward the Hume Motorway and is represented by the ambient noise levels recorded at L4. It is noted that ambient noise levels measured at L4 were generally lower than those measured at other similar locations by Atkins Acoustics (ie M20, M21 and M23) however the lower levels have been utilised for this assessment and provides a conservative approach for the determination of PSNLs in this area.

- NCA4: this area is representative of all other typically rural locations within the project study area. Ambient noise levels in this area are consistent with the minimum level provided in the INP and consistent with those measured at locations L2, L3, M10, M12 and M16.

- NCA5: this area, as shown in Figure 5.1, is located north-east of the mine and represents most residences located on this northern section of Rockford Road, Tahmoor. It is represented by ambient noise levels measured at M5 and M6.

- NCA6: this area, as shown in Figure 5.1, is located north-east of the mine and represents most residences located on Stratford Road, Tahmoor. It is represented by ambient noise levels measured at M4 and M7.

- NCA7: this area contains three residential dwellings adjacent to the service station north of the mine on Remembrance Drive. It is represented by the ambient noise levels recorded at M3.

- NCA8: this area, as shown in Figure 5.1, is relevant to the western end of Olive Lane and is represented by the ambient noise levels recorded at M2.

- NCA9: this area, as shown in Figure 5.1, is located south-west of the mine and represents most residences located on Caloola Road and Yarran Road, Bargo. It is represented by the ambient noise levels recorded at M13.

The intrusive noise criteria determined from the RBLs for the noise catchment areas are presented in Table 6.1.

Table 6.1 Intrusive noise criteria

NCA (representative logger location)	Adopted RBL, dB			Intrusive criteria, $L_{Aeq,15min}$, dB		
	Day	Evening	Night	Day	Evening	Night
1 (L5)	44	37	30	49	42	35
2 (L1)	39	37	30	44	42	35
3 (L4)	33	33	30	38	38	35
4 (L2, L3)	30	30	30	35	35	35
5 (M5, M6)	32	30	30	37	35	35
6 (M4, M7)	34	32	32	39	37	37
7 (M3)	41	37	34	46	42	39
8 (M2)	41	40	32	46	45	37
9 (M13)	39	38	30	44	43	35

Notes: Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night: all remaining periods.

6.1.2 Amenity

The assessment of amenity is based on noise criteria specific to the land use. The criteria relate only to industrial noise and exclude road or rail noise. Where the measured existing industrial noise approaches recommended amenity criteria, it needs to be demonstrated that noise levels from new industry will not contribute to existing industrial noise.

Assessment locations within NCA1, NCA2, NCA7, NCA8 and NCA9 have been categorised in the INP (EPA 2000) suburban amenity category in accordance with the INP definition of a suburban receiver type (ie an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry). All other assessment locations (NCA3 and NCA4) have been categorised in the INP (EPA 2000) rural amenity category in accordance with the INP definition of a rural receiver type, ie an area with an acoustical environment that is dominated by natural sounds and generally characterised by low background noise levels. Due to lack of other existing or proposed (approved and not yet built) industry in the area no adjustment to the acceptable amenity levels was required.

The corresponding recommended amenity criteria for all assessment locations adopted for the project are given in Table 6.2. The only consequence of the two residential classifications is the daytime amenity level, and as demonstrated in the derived criteria in Table 6.3, this has no bearing on the project specific noise levels.

Table 6.2 Amenity criteria

NCA	Indicative area	Recommended 'acceptable' noise, $L_{Aeq,period}$, dB			Recommended 'maximum' noise, $L_{Aeq,period}$, dB		
		Day	Evening	Night	Day	Evening	Night
1	Suburban	55	45	40	60	50	45
2	Suburban	55	45	40	60	50	45
3	Rural	50	45	40	55	50	45
4	Rural	50	45	40	55	50	45
5	Rural	50	45	40	55	50	45
6	Rural	50	45	40	55	50	45

Table 6.2 Amenity criteria

NCA	Indicative area	Recommended 'acceptable' noise, $L_{Aeq,period}$, dB			Recommended 'maximum' noise, $L_{Aeq,period}$, dB		
		Day	Evening	Night	Day	Evening	Night
7	Suburban	55	45	40	60	50	45
8	Suburban	55	45	40	60	50	45
9	Suburban	55	45	40	60	50	45
College[2] (internal)	All	$L_{Aeq(1hour)}$ 40	-	-	$L_{Aeq(1hour)}$ 45[3]-	-	-
Place of worship (internal)	All	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 45	$L_{Aeq(1hour)}$ 45	$L_{Aeq(1hour)}$ 45

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night: all remaining periods.
2. The recommended acceptable noise amenity level for an existing school affected by existing industrial noise sources has been established as per Note 10 to Table 2.1 of the INP. Amenity criteria for the College applies "when in use" – it has been assumed the College operates during the day period only.
3. It has been inferred that the recommended maximum amenity noise level for an existing school affected by existing industrial noise sources is 5 dB higher than the recommended acceptable level, consistent with all other receiver types listed in Table 2.1 of the INP.

6.1.3 Project specific noise levels

The project specific noise levels (PSNLs) are the more stringent of either the intrusive or amenity criteria. Where the amenity criterion is lower than the intrusive criterion, it does not automatically follow that the amenity criteria would be more stringent due to the relative time periods over which they apply. Where this situation arises, it is necessary to demonstrate that both the amenity and intrusive criteria can be achieved.

The PSNLs determined for the project for all relevant assessment periods are the relevant intrusive criteria and are shown in 'bold' text in Table 6.3. In all instances, the intrusive criteria are more limiting for residences.

Table 6.3 Project specific noise levels

NCA	Intrusive criteria, $L_{Aeq,15min}$, dB			Amenity criteria, $L_{Aeq,period}$, dB			PSNL, $L_{Aeq,15min}$, dB		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1	**49**	**42**	**35**	55	45	40	**49**	**42**	**35**
2	**44**	**42**	**35**	55	45	40	**44**	**42**	**35**
3	**38**	**38**	**35**	50	45	40	**38**	**38**	**35**
4	**35**	**35**	**35**	50	45	40	**35**	**35**	**35**
5	**37**	**35**	**35**	50	45	40	**37**	**35**	**35**
6	**39**	**37**	**37**	50	45	40	**39**	**37**	**37**
7	**46**	**42**	**39**	55	45	40	**46**	**42**	**39**
8	**46**	**45**	**37**	55	45	40	**46**	**45**	**37**
9	**44**	**43**	**35**	55	45	40	**44**	**43**	**35**
College (internal)	-	-	-	$L_{Aeq(1hour)}$ 40	-	-	$L_{Aeq(1hour)}$ 40	-	-
Church (internal)	-	-	-	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40	$L_{Aeq(1hour)}$ 40

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods.

6.2 Sleep disturbance

Based on the guidance provided in the INP, Table 6.4 provides the sleep disturbance screening criteria for the residential assessment locations.

Table 6.4 Sleep disturbance screening criteria, residential assessment locations

NCA	Adopted RBL, dB	Sleep disturbance screening criteria, L_{Amax} (dB)
1	30	45
2	30	45
3	30	45
4	30	45
5	30	45
6	32	47
7	34	49
8	32	47
9	30	45

Reference has also been made to the conclusions presented in the RNP as well as the more current guidance provided in the NPfI.

6.3 Applying the INP to existing sites

The INP provides guidance on the application of noise criteria to existing industrial sites such as the Tahmoor Mine. Section 1.4.2 summarises the INP approach to assessment of noise from existing noise sources as follows:

> The application of the criteria to existing sources of noise would occur where significant modifications (such as to warrant serious and/or ongoing development consent or EPA approval) are made to existing developments or where complaints are received. In applying the policy to existing operations, it is acknowledged that the scope for applying reasonable and feasible mitigation measures to existing noise sources is usually far more limited than for new developments. Careful consideration of noise impacts and the feasible and reasonable mitigation measures available at these sites may result in less stringent noise limits than would ideally apply. Sometimes the resultant noise limits will be above the criteria.

The INP Application Notes state that if PSNLs are not achieved from existing operations, "*a preliminary analysis of potential noise mitigation measures, and conceptual noise reductions, needs to be undertaken for the existing premises.*" Decisions regarding the required noise mitigation measures will be made on a case-by-case basis and consider various factors including, but not limited to, the feasible and reasonable mitigation options, the absolute level of noise, likely improvement to existing noise levels and existing measures of community impact including complaints.

This assessment has adopted the procedures outlined in the INP for existing industrial sites.

7 Operational noise assessment

7.1 Overview

This section presents the methods and base parameters used to model noise emissions from the existing Tahmoor mine and TSP, including the effects of noise-enhancing meteorological conditions.

Noise modelling was based on three-dimensional digitised ground contours of the surrounding land and surface infrastructure for the existing operations as well as construction and operational phases of the TSP. The construction and operational noise models represent snapshots, with equipment placed at various locations and heights, representing realistic scenarios.

Noise predictions were carried out using the Brüel & Kjær Predictor software. 'Predictor' calculates total noise levels at assessment locations from concurrent operation of multiple noise sources. The model considers factors such as the lateral and vertical location of plant, source-to-receptor distances, ground effects, atmospheric absorption, topography of the site and surrounding area and applicable meteorological conditions.

Noise emission predictions for the Anglican Church and College are internal levels for direct comparison to the relevant amenity criteria. A reduction of 25 dB from the predicted external noise level has been used assuming that the affected façade does not have any open windows or doors.

7.2 Operational noise modelling – existing mine and unmitigated TSP

Table 7.1 summarises the operational noise sources and associated sound power levels used in the noise model. The equipment items and quantities are based on the current operations. Most of the sound power data were obtained from noise measurements of existing activities at the site. Where this was not possible, sound power data has been obtained from an EMM database of similar plant and equipment.

Noise from existing operations was modelled and calibrated to the results of operator-attended noise surveys around the site. Noise from operation of the proposed TSP was also predicted. Details of the operational scenarios considered are presented in Table 7.1. Figures showing the indicative locations of assumed noise sources across the site for the existing operations and the TSP are provided in Appendix B.

All sources were assumed to operate continuously during all periods (day, evening and night) for both the existing and unmitigated TSP scenarios.

Table 7.1 Operational acoustically significant plant and equipment and sound power levels

Item	Sound power level per item, dB(A)	Included in modelled scenario	
		Existing	TSP (Unmitigated)
Conveyors	90-100	✓	✓
CHPP	115	✓	✓
D9 Dozer Stockpile	115	✓	✓
Locomotives (2 per train)	105	✓	✓
Reject haul truck	115	✓	✓
Reject loading	97	✓	✓
Reject haul truck -tipping	99	✓	✓
Ventilation fan (Shaft 2)	91	✓	✗
Ventilation fan (TSC2)	91	✗	✓
D9 Dozer ROM	115	✓	✓
Dozer REA	111	✓	✓
Gas plant	104	✓	✓
600t Coal bin feeders	90	✓	✓
Tunnel fan exhaust	86	✓	✓
5C tripper conveyor drive	91	✓	✓
Tunnel fan clean stockpile	70	✓	✓
7C conveyor drive building	101	✓	✓
Tunnel fan (4F)	73	✓	✓
Water treatment tanks (2)	71	✓	✓
Flares (3)	82	✓	✓
Compressor building roof fans	99	✓	✓
ROM stockpile dump	98	✓	✓
Transfer building (3S-4C)	95	✓	✓
Transfer building (3S-4S)	95	✓	✓
Raw bin conveyor drive (3F)	95	✓	✓
Transfer building (4F-3F)	95	✓	✓
Co-gen plant	99	✓	✓
Transfer building (1F-3F)	97	✓	✓
Transfer building (2A-1F)	97	✓	✓
Rail loading	109	✓	✓
Champion compressors	105	✓	✓
Compressor building	91	✓	✓

Table 7.1 Operational acoustically significant plant and equipment and sound power levels

Item	Sound power level per item, dB(A)	Included in modelled scenario	
		Existing	TSP (Unmitigated)
Drift conveyor building	99	✓	✓
Raw coal silo	87	✓	✓
Winder building fan	90	✓	✓
Pumps (thickeners)	92	✓	✓

Notes: 1. When the new ventilation fans associated with the TSP are constructed, the existing upcast fan Shaft 2 will be used as a back up only. Thus, noise emissions from the TSP have been predicted with the existing upcast fan Shaft 2 not operational.

Based on the results of the quarterly noise compliance monitoring the LFN modifying factor has been applied to noise emissions predicted at the Olive Lane residences (+2dB during the day and +5dB during the evening and night) and the Anglian Church and College (+2dB during the daytime only).

Results are presented in table format in Appendix C and as indicative noise contours in Appendix D. The results table provides the predicted noise emission level at each assessment location and a comparison to relevant PSNLs. A comparison of predicted noise emissions from the TSP to predicted noise emissions from the existing Tahmoor mine operations is also provided.

Further discussion of predicted noise emissions is provided in Section 7.5. Since PSNLs are predicted to be exceeded, an assessment of reasonable and feasible mitigation has been undertaken with the aim of achieving the PSNLs in accordance with the methodology provided in the INP for the assessment of noise emissions from existing sites. Reference has also been made to guidance provided in the NPfI regarding the assessment of reasonable and feasible mitigation.

7.3 Feasible and reasonable noise mitigation

7.3.1 Overview

A noise mitigation measure is considered feasible if it can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements.

Reasonableness relates to the application of judgement in arriving at a decision, taking into account whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure.

The following factors have been considered when evaluating the available noise mitigation options:

- Noise impacts:
  - existing and future noise levels, and projected changes in noise levels;
  - the amount by which the triggers are exceeded.
- Noise mitigation benefits:
  - amount of noise reduction expected;

- number of people likely to benefit;

- Cost-effectiveness of noise mitigation:
  - total cost of mitigation measures (including capital and maintenance);
  - ongoing operational and maintenance cost borne by the community (eg running air conditioners if closing dwelling windows is required to improve noise);

- Community views:
  - aesthetic considerations;
  - views of all potentially affected areas determined through community consultation.

7.3.2 Assessment of mitigation

Consideration of the feasibility and reasonableness of existing and additional noise mitigation measures has been undertaken with reference to the guidance provided in the INP and Section 3.4 of the NPfI. The NPfI also provides the following guidance on the application of noise mitigation to existing premises:

> The range of noise reduction strategies for existing situations is generally more limited than those available for new development at the planning stage. For example, spatial separation between the source and receiver is not an option for existing situations. The initial focus for existing sites should be operational procedures and prioritising noise-control measures that provide the greatest benefits to residents at least cost.

The main operational noise sources at the site are the CHPP and dozers. Other significant sources that contribute to off-site noise emissions include rail loading activity (locomotives and loading coal into wagons), compressors and the reject haul truck. Mitigation options targeting these noise sources have been considered as provided in Table 7.2. Mitigation strategies have been considered in the following hierarchical approach:

1. control of noise at the source;
2. once the feasible and reasonable controls at the source are exhausted, controlling the transmission of noise; and
3. once source and transmission feasible and reasonable controls are exhausted, considering mitigation measures at the noise-sensitive receivers.

Table 7.2 Mitigation decision-making matrix

Mitigation option	Feasible?	Reasonable?	Justification for adopting / disregarding and expected noise benefit
At-source controls			
Close openings on CHPP facades	Yes	Yes	These measures will require significant capital investment but are expected to result in a significant reduction to noise emissions from the CHPP; up to 10dB reduction. Being one of the main contributors to off-site mine noise emissions these controls to the CHPP will have the benefit of reducing mine noise at neighbouring residences. It is also anticipated that these measures would improve LFN from the CHPP.
Improved cladding and insulation for CHPP roof	Yes	Yes	
Improved cladding and insulation for north, east and western facades	Yes	Yes	
Noise suppression kit for dozer	Yes	Yes	The noise suppression kit is expected to result in a 4dB reduction to the overall dozer sound power level. Being one of the main contributors to off-site mine noise emissions these controls to the dozer will have the benefit of reducing mine noise at neighbouring residences.
Use of only one dozer at night (either on the ROM or stockpile area)	Yes	Yes	
Restrict dozer operation to northern section of stockpile area at night	Yes	Yes	This measure would be used in conjunction with the above measures and will also maximise the benefit of the proposed barrier around the coal stockpile area (refer below).
Extend conveyor to REA to negate the need for the rejects truck to use the northern section of haul road	Yes	No	This would provide negligible acoustic benefit at significant cost. There would be some benefit to residences north of the REA but increased impacts to the south due to increased truck activity in the southern area of REA.
Restrict activity in the REA to day and evening only – no haulage or dozer operation in REA at night	Yes	Yes	This will result in improved acoustic outcomes particularly for those residences north and south of the REA. Additional on-site operational management measures will be required to manage overburden material during the night time.
Purchase new, quieter haul truck	Yes	No	The option to restrict night-time haulage was preferred as it provides a greater acoustic benefit and reduces the need for additional capital expenditure. This option may be considered in the future if required.
Improve feed chute into rail wagons	Yes	Yes	Engineering design will be used to improve the feed of coal into the wagons to reduce the maximum noise event associated with this activity. This measure is expected to result in a reduction to the sound power level for this activity of 5 dB.
Improvement to enclosure of Champion compressors.	Yes	Yes	The current Champion compressor enclosure is open on several sides. Full enclosure of these items is expected to result in a 8 dB reduction to the sound power level.
Control transmission of noise			
Barrier around coal stockpile area	Yes	Yes	The barrier would be located along the western side of the existing stockpile area (indicative extents are shown in Appendix B) and be in the form of 3 shipping containers stacked on each other. The barrier would have maximum benefit to reduce noise from the dozer when the dozer is operating in the northern section of the stockpile area (refer above).
Extended barrier around southern end of coal stockpile area	No	No	The required height of the barrier to provide any material acoustic benefit would not be feasible to build. A feasible height (eg 4 shipping containers stacked on each other) would provide negligible acoustic benefit.

Table 7.2 Mitigation decision-making matrix

Mitigation option	Feasible?	Reasonable?	Justification for adopting / disregarding and expected noise benefit
Improve performance (increase height) of bund to shield northern section of rail loop	Yes	Yes	This barrier would have the benefit of further reducing locomotive engine noise and noise from wheel/track interaction when rail loading is occurring.
Mitigation at the receptor			
Receptor mitigation	Yes	Yes – at two receptors	There have been a significantly reduced number of complaints received with regard to noise over the previous several years and from only one resident in Olive Lane. The TSP will result in improved noise emissions compared to existing at all but two residences. Tahmoor Coal has commenced negotiations with these two residents (125 and 215 Charlies Point Road). The type of mitigation measures that could be implemented at the residents will depend on the outcomes of relevant negotiations.

It is anticipated that all the feasible and reasonable noise mitigation measures identified above will be completed within three years of physical commencement of the TSP.

7.4 Operational noise assessment – mitigated TSP

Table 7.3 summarises the operational noise sources and associated sound power levels used in the noise model for the TSP including all feasible and reasonable noise mitigation measures. A figure showing the indicative locations of modelled noise sources and noise barriers is provided in Appendix B.

Table 7.3 Operational acoustically significant plant and equipment and sound power levels

Item	Sound power level per item, dB(A)	Operational during this period		
		Day	Evening	Night
Conveyors	90-100	✓	✓	✓
CHPP	109	✓	✓	✓
D9 Dozer Stockpile	111	✓	✓	✓
Locomotives (2 per train)	105	✓	✓	✓
Reject haul truck	115	✓	✓	✗
Reject loading	97	✓	✓	✗
Reject haul truck -tipping	99	✓	✓	✗
Ventilation fan (Shaft 2)	91	✗	✗	✗
Ventilation fan (TSC2)	91	✓	✓	✓
D9 Dozer ROM	115	✓	✓	✗
Dozer REA	111	✓	✓	✗
Gas plant	104	✓	✓	✓

Table 7.3 Operational acoustically significant plant and equipment and sound power levels

Item	Sound power level per item, dB(A)	Operational during this period		
		Day	Evening	Night
600t Coal bin feeders	90	✓	✓	✓
Tunnel fan exhaust	86	✓	✓	✓
5C tripper conveyor drive	91	✓	✓	✓
Tunnel fan clean stockpile	70	✓	✓	✓
7C conveyor drive building	101	✓	✓	✓
Tunnel fan (4F)	73	✓	✓	✓
Water treatment tanks (2)	71	✓	✓	✓
Flares (3)	82	✓	✓	✓
Compressor building roof fans	99	✓	✓	✓
ROM stockpile dump	98	✓	✓	✓
Transfer building (3S-4C)	95	✓	✓	✓
Transfer building (3S-4S)	95	✓	✓	✓
Raw bin conveyor drive (3F)	95	✓	✓	✓
Transfer building (4F-3F)	95	✓	✓	✓
Co-gen plant	99	✓	✓	✓
Transfer building (1F-3F)	97	✓	✓	✓
Transfer building (2A-1F)	97	✓	✓	✓
Rail loading	104	✓	✓	✓
Champion compressors	97	✓	✓	✓
Compressor building	91	✓	✓	✓
Drift conveyor building	99	✓	✓	✓
Raw coal silo	87	✓	✓	✓
Winder building fan	90	✓	✓	✓
Pumps (thickeners)	92	✓	✓	✓

As described in Table 7.2 it is anticipated that improvements will be made to the emission of the CHPP through the application of the feasible and reasonable measures (ie closing openings and improved cladding and insulation). Notwithstanding this, the likely improvement to LFN emissions cannot be precisely quantified and hence the same LFN modifying factor has been applied to predictions for the residences in Olive Lane as well as the church and school. Improvements will be monitored and reported in accordance with the relevant noise compliance monitoring requirements.

Noise emission predictions are presented in table format in Appendix C and as indicative noise contours in Appendix D. For simplicity and due to the significant number of assessment locations modelled, detailed single-point results have only been provided where noise emissions under noise-enhancing weather conditions are predicted to be above the project-specific noise level.

The results table provides the predicted noise emission level at each assessment location and a comparison to relevant PSNLs. A comparison of predicted noise emissions from the mitigated TSP to predicted noise emissions from the existing Tahmoor mine operations is also provided. In addition, predicted noise impacts from the mitigated TSP have been categorised as per Table 1 of the VLAMP with reference to noise predictions under noise-enhancing weather conditions. These categorisations are displayed spatially in Appendix E.

7.5 Operational noise assessment summary

Table 7.4 provides a summary of the number of assessment locations for each operational scenario (existing, unmitigated TSP and mitigated TSP) where predicted noise emissions are in the following categories:

- No more than 2 dB above PSNL;
- 3-5 dB above PSNL; and
- More than 5 dB above PSNL.

Table 7.4 Number of assessment locations compared to PSNLs

Category	Existing Tahmoor mine			TSP Unmitigated			Mitigated TSP		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Noise-enhancing									
No more than 2dB above PSNL	2585	2556	2464	2585	2553	2460	2683	2657	2716
3-5 dB above PSNL	128	133	172	124	129	167	70	70	28
More than 5 dB above PSNL	50	74	127	54	81	136	10	36	19
Calm									
No more than 2dB above PSNL	2697	2675	2619	2700	2675	2610	2749	2721	2743
3-5 dB above PSNL	58	67	86	55	68	95	12	35	12
More than 5 dB above PSNL	8	21	58	8	20	57	2	7	7

Key points from the operational noise assessment are summarised as follows:

- Development of the TSP will result in a significant reduction in the number of privately-owned dwellings affected by night-time mine noise emissions more than 5 dB above the relevant PSNL; 19 for operation of the mitigated TSP compared to 127 for existing Tahmoor mine operations.
- As per the results presented in Appendix C, mine noise with the mitigated TSP is expected to reduce at assessment locations compared to existing levels by at least 2 dB and up to 9 dB at all assessment locations during the night-time period.

- Mine noise with the mitigated TSP during the day and evening periods is expected to reduce by up to 6 dB compared to existing levels at all but two assessment locations. The exceptions are the residences at 185 and 215 Charlies Point Road where noise levels are predicted to increase by 3 dB compared to existing mine levels as a result of the southern extension to the REA and the new ventilation fans. Predicted night-time noise levels at these two properties are 40 dB and 39 dB (ie 5 dB and 4 dB above PSNLs, respectively).

- Mine noise at the Anglican Church and school are predicted to achieve the relevant internal amenity noise levels.

- Table 7.5 provides a summary of the number of assessment locations in each noise impact category in accordance with Table 1 of the VLAMP. The figure provided in Appendix E shows the assessment locations categorised as significant, moderate, marginal or negligible, consistent with VLAMP definitions. In some cases, locations categorised as significant are relatively further from the mine than those with a moderate or marginal impact category. This is due to several factors including rounding of noise predictions, local topographical features and the relative criteria for these locations (intrusive and amenity).

Table 7.5 Number of assessment locations in each VLAMP noise impact category for mitigated TSP

Satisfies PSNL	Negligible	Marginal	Moderate	Significant
2538	93	83	28	20

Tahmoor Coal will continue to investigate options for further noise mitigation into the future including, but not limited to, the following:

- consideration of a new haul truck for use in the REA with the inclusion of noise attenuation and/or noise specification in the supply contract;

- additional investigations regarding mitigation for the CHPP;

- consideration of noise mitigation initiatives in the purchase and/or design of all new equipment as well as any new site buildings and access roads.

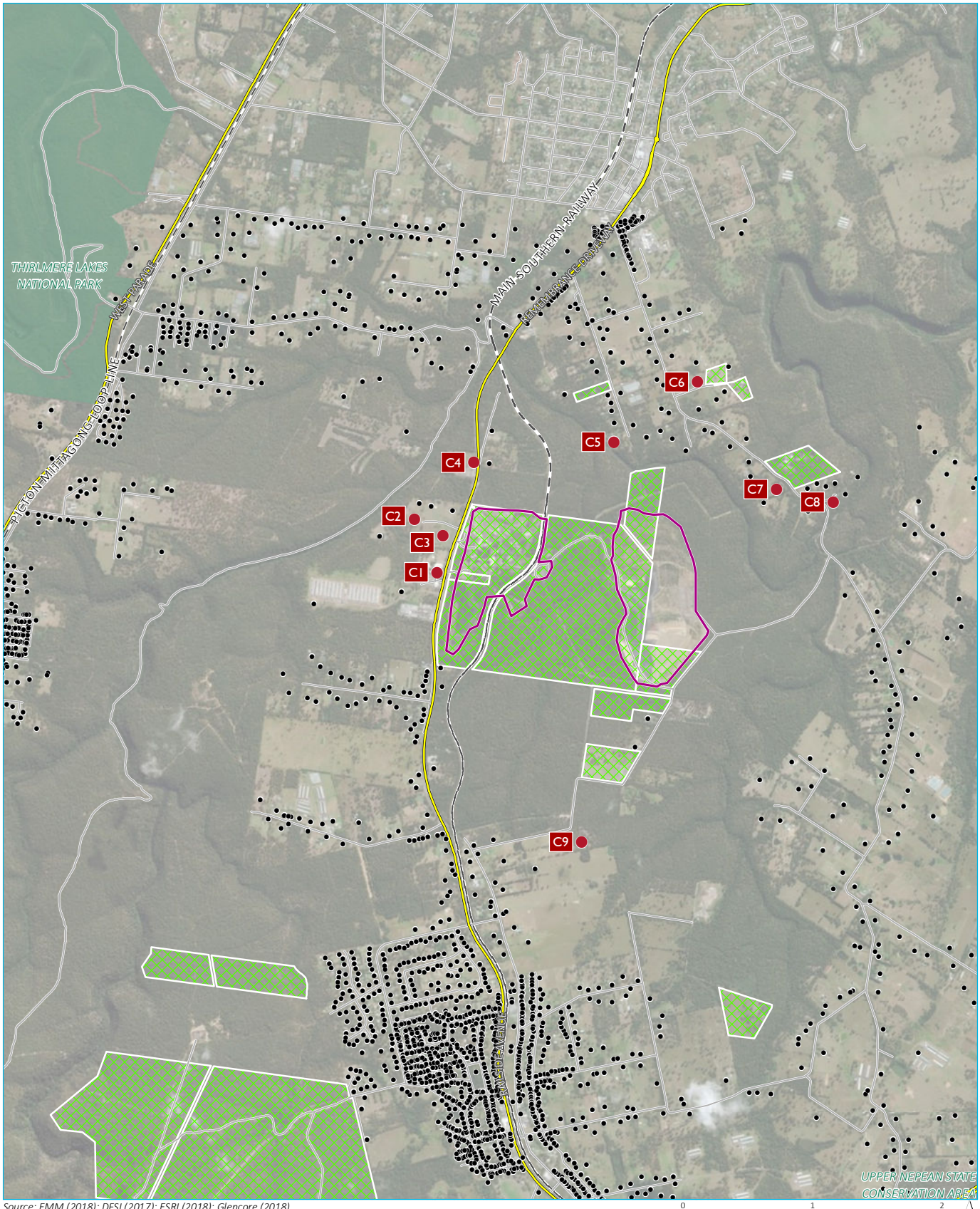
Chapter 8 of the INP describes the process regarding negotiation where noise emissions are predicted to be above the PSNLs. Section 8.2 of the INP states that "*Negotiation on what represents the best achievable level that is practicable for a development is often an iterative process involving both the proponent and regulator/consent authority and the proponent and affected community.*" Section 10.1 of the INP also states that "*Where noise emissions from the site exceed the project-specific noise levels, the regulatory authorities and the noise-source manager need to negotiate achievable noise limits for the site. The project-specific noise levels should not be applied as mandatory noise limits. The project-specific noise levels supply the initial target levels and drive the process of assessing all feasible and reasonable control measures. Achievable noise limits result from applying all feasible and reasonable noise control measures. For sites with limited mitigation measures the achievable noise limits may sometimes be above the project-specific noise levels.*"

To assist in the negotiation process that will likely be an outcome of this study Table 7.6 provides a summary of the predicted noise levels at nine locations around the mine. These locations (refer Figure 7.1) have been selected from the ten existing quarterly noise monitoring locations with the exceptions being M1 and M10. Location M1 is the service station located south of the Anglican College and is not considered necessary given that it is not a particularly noise-sensitive receptor and given the close proximity of location M2. Given the proximity of M10 to the REA extension it is recommended that 80 Charlies Point Road would be a more appropriate noise monitoring location.

Table 7.6 Predicted 'achievable' noise levels (noise enhancing)

Location	PSNL ($L_{Aeq,15\ minute}$,dB unless otherwise noted)			Existing Tahmoor mine operations ($L_{Aeq,15\ minute}$,dB)			Mitigated TSP ($L_{Aeq,15\ minute}$,dB)			Predicted change in mine noise (dB)		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
C1. Wollondilly Anglican College and Church (M2)	$L_{Aeq,period}$ 50 (when in use)			59	62	62	56	59	57	-3	-3	-5
C2. 7 Olive Lane (M3)	46	45	37	55	58	58	51	54	51	-4	-4	-7
C3. Eastern end of Olive Lane (M4)	n/a	n/a	n/a	59	62	62	55	58	55	-3	-3	-7
C4. Northern service station on Remembrance Drive (M5)	$L_{Aeq,period}$ 65 (when in use)			50	50	50	47	47	44	-2	-2	-6
C5. Southern end of Stratford Rd (M6)	39	37	37	46	46	46	44	44	39	-2	-2	-7
C6. Eastern end of Hodgson Grove (M7)	37	35	35	42	42	42	40	40	34	-1	-1	-8
C7. Rockford Road, near existing vent fan (M8)	35	35	35	40	40	40	37	37	31	-3	-3	-9
C8. Kammer Place (M9)	35	35	35	36	36	36	35	35	31	-1	-1	-5
C9. 80 Charlies Point Road (to replace M10)	35	35	35	42	42	42	40	40	36	-2	-2	-6

Notes: 1. Noise level predictions presented in this table include the relevant LFN modifying factor.



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

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KEY

- Location for achievable noise levels
- Assessment location
- Tahmoor-owned land
- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

Locations for "Achievable" noise levels

Tahmoor South Project
Noise impact assessment
Figure 7.1

EMM
creating opportunities

8 Sleep disturbance assessment

8.1 Existing maximum noise events

The current consent and EPL do not contain any limits with regard to night-time maximum noise levels and maximum noise events from the mine are not recorded during the quarterly operator-attended noise compliance surveys.

Based on the results of operator-attended noise surveys undertaken by EMM in Olive Lane, existing maximum noise levels from Tahmoor Mine are in the order of L_{Amax} 53 dB from general dozer activity or loading coal into wagons. Based on a partially open window providing 10 dB of sound reduction this would equate to an approximate internal noise level of L_{Amax} 43 dB. Although this external level is above the relevant screening criteria, the calculated internal noise levels are well below those that are likely to cause awakening reactions (refer to Section 3.5).

8.2 Previous and proposed noise mitigation

Maximum noise levels from existing operations have previously been the subject of a PRP relevant to the site. As described in Section 4.2, engineered mitigation controls have been effectively implemented as part of the Tahmoor Mine's PRPs to reduce and control maximum noise events. Controls specific to the reduction of maximum noise events that have been implemented over time include the following:

- laminated transfer chutes at conveyor transfer points;
- lagging of the reject stone bin;
- limit switches to ensure the stone bin levels are maintained at not less than 30% full to avoid impact noises associated with empty bins;
- replacement of mobile plant reversing alarms with low level, broad-spectrum alarms (colloquially referred to as "quackers"); and
- installation of an onsite real-time noise monitor.

Noise reduction measures that have been considered as part of the mitigated TSP will have the effect of further reducing maximum noise levels from site. These measures include the following as described in Section 7.3:

- increased height of barrier adjacent to the north-western side of the rail loop;
- improvement to feed chute into rail wagons to reduce impact noise when loading of coal commences into each wagon;
- additional cladding and insulation on CHPP building;
- noise-suppression kit for dozer; and
- no activity (haulage or dozer) will occur in the REA during the night time.

8.3 Future maximum noise events

It is expected that both the frequency and level of maximum noise events from the TSP will be lower compared to the existing operation due to the mitigation measures to be implemented as part of the TSP.

Operation of the TSP during the night-time is likely to result in maximum noise events below those likely to cause awakening reactions and satisfy the relevant maximum noise level screening criteria.

9 Road traffic noise assessment

The nearest residential facades potentially affected by an increase in road traffic volumes as a result of the TSP are mostly located on Remembrance Driveway, north and south of the site access road. Road traffic movements associated with some of the proposed construction activities (ie TSC1 and TSC2 vent shaft construction) will require the use of additional roads surrounding the site including Rockford Road (from Remembrance Driveway north of the site access road) and Charlies Point Road. Hence, the potential for road traffic noise impact has also been considered at the nearest residential facades along these roads during the TSC1 and TSC2 vent shafts construction (scheduled for between 2019-2023).

Existing traffic volumes were referenced from the *Traffic Impact Assessment for Tahmoor South Project* prepared by Transport and Urban Planning Pty Ltd (TUP) November 2018. Peak period traffic counts were undertaken by TUP during the morning (6-9:30 am) and afternoon (2-6 pm) in August 2017. These periods also correspond to the shift change periods at the site.

This assessment of road traffic noise has been based on existing average daily traffic (ADT) volumes. Road traffic volumes have been based on site traffic surveys completed on the site access road in August 2017 and are summarised in Table 9.1.

Table 9.1 Existing (2017) traffic volumes

Road	Road section	ADT (2017)	% Heavy vehicle
Remembrance Driveway	North of site access road	9,467	7.3
Remembrance Driveway	South of site access road	8,866	7.5
Rockford Rd	North of Charlies Point Rd	2,762	6.2
Charlies Point Rd	North of TSC1/TSC2	119	7.5

Notes: 1. Vehicle numbers and HV % have been extrapolated from the morning and afternoon peak hourly vehicle traffic proportions as per the traffic assessment report (TUP 2018).

Current site related traffic include primarily employees (or contractors) travelling to and from the site on Remembrance Driveway during shift changes. Site employee traffic volumes are expected to increase between 2017 and 2020 (peak in 2020) as a result of the TSP and associated activities. During the TSP construction activities, site generated traffic volumes (LV and HV) are also expected to peak in 2020 due to overlapping on-site construction works (eg mine compound, underground mine extension, surface infrastructure, new parking and internal road) and TSC1 and TSC2 construction works. This assessment has therefore predicted road traffic noise levels for the worst-case year (2020) and is considered to be conservative for the TSP, as described above. Road traffic noise levels generated by TSP-related traffic movements are expected to be lower during other TSP operational and/or construction years.

For the purpose of this assessment, half of the site employees (or contractors) travel north of the site entrance road on Remembrance Driveway, and the other half travel south of the site road. This has been applied for both the operational and construction phases and is considered consistent with the TUP assessment. Site traffic for the construction of TSC1 and TSC2 will travel north from the site access road then on to Rockford Road and Charlies Point Road.

The Calculation of Road Traffic Noise (CoRTN) (UK Department of Transport) method was used to predict the noise levels at the nearest potentially affected receivers on Remembrance Driveway. The Federal Highway Traffic Noise Model (FHWA) (US Department of Transportation) method was used to predict road traffic noise levels along Rockford Road and Charlies Point Road where traffic volumes are relatively low. This is because the CoRTN method is known to generally underpredict noise levels where traffic volumes are low (ie <200 movements per hour) and hence the FHWA method was deemed to be more appropriate to assess impact at receivers on Rockford Road and Charlies Point Road. Both prediction methods consider traffic flow volume, average speed, percentage of heavy vehicles and road gradient to establish noise source strength, and includes attenuation due to distance, ground absorption and screening from buildings or barriers.

Road traffic noise levels predicted at the nearest receivers (facades facing the road) to the relevant roads for the TSP are shown in Table 9.2.

Table 9.2 Road traffic noise results

Road	Road section	Receiver type (distance from road)	Existing (2017) noise levels $L_{Aeq,period}$, dB		Future[1] (2020) noise levels $L_{Aeq,period}$, dB		Criteria $L_{Aeq,period}$, dB		Increase between existing and future, dB	
			Day	Night	Day	Night	Day	Night	Day	Night
Remembrance Dr	North of Rockford Rd	Residence (10 m)	63	58	63	58	60	55	<1	<1
	Between site and Rockford Rd	Residence (14 m)	61	55	61	56	60	55	<1	<1
	South of site	Residence (18 m)	62	57	62	57	60	55	<1	<1
		School/ Church[1,2]	48 (internal)	N/A	48 (internal)	N/A	40 (internal)	N/A	<1	N/A
Rockford Rd[3,4]	North of Charlies Point Rd	Residence (15 m)	63	58	64	58	60	55	<1	1
Charlies Point Rd[3,4]	North of TSC1/TSC2	Residence (40 m)	46	41	53	49	60	55	7	8

Notes: 1. Levels for this receiver are $L_{Aeq,1hr}$ internal noise levels, where an external-to-internal reduction of 10 dB has been applied for partially opened windows.
2. Internal $L_{Aeq,1hr}$ criterion applies when in use.
3. Existing site generated traffic volumes on this road are generally very low.
4. Site related traffic on this road are only for TSC1 and TSC2 construction.

Existing (2017) road traffic noise levels currently exceed or are equal to the relevant RNP criteria at the nearest affected receivers along Remembrance Driveway. The existing (2017) level of road traffic noise calculated at the nearest residential facade along Rockford Road also currently exceeds the relevant criteria. At receivers along Charlies Point Road, the existing (2017) level of road traffic noise is calculated to be well below the relevant criteria. It is noted that existing site generated traffic on Rockford Road and Charlies Point Road is generally very low and hence would not generally contribute to the day $L_{Aeq,15hr}$ or night $L_{Aeq,9hr}$ road traffic noise levels.

Including the proposed TSP (peak) traffic volumes, future (2020) road traffic noise levels at the nearest receivers on most roads are predicted to marginally increase by up to 1 dB for the relevant periods. Such an increase is considered negligible and satisfies the RNP 2dB allowance increase following all feasible and reasonable mitigation measures. At receivers along Charlies Point Road, future (2020) road traffic noise levels are predicted to increase by up to 7 dB and 8 dB compared to the existing (2017) levels of road traffic noise calculated for day and night. However, this is below the RNP road traffic relative increase criteria ($L_{Aeq,period}$ + 12 dB) for residential land uses and overall road traffic noise levels are predicted to be below the relevant day and night-time criteria. Therefore, the TSP is not expected to generate road traffic noise impacts at the nearest potentially affected receivers.

10 Construction noise assessment

10.1 Construction activity

Site establishment and construction activities associated with the ventilation shafts (other than drilling) would be undertaken between 7 am and 6 pm Monday to Friday, and 8 am to 1 pm Saturday, and therefore consistent with the ICNG standard hours. Ventilation shaft drilling would be continuous 24 hours a day, 7 days a week.

TSC1 is proposed to be constructed over a period of approximately 2 years; 18 months of site establishment and developing site access followed by fan installation over approximately 6 months. Construction of TSC2 will follow immediately after TSC1 is complete (ie not concurrently) and over a similar timeframe.

Mobilisation for each site would include delivery of approximately forty (40) standard and two (2) wide semitrailer loads of drill rig components, auxiliary drill rig items, storage containers, temporary site amenities and construction equipment.

Civil works to establish the drilling area and associated water holding facilities will involve:

- Bunding around the site perimeter to prevent the ingress of water.
- Construction of circulation ponds.
- Bunding around the circulation ponds to prevent vehicles and personnel access.
- Establishment of environmental controls as required.
- Construction of the liner fabrication pad, approximately 200 mm thick, with width and length determined by the size and number of liner pieces to be manufactured.
- Construction of the drill slab, shaft collar and drill rig foundations.
- Installation of underground services, including:
    - electrical services to each component of the works;
    - return water pipe built into the shaft collar;
    - overflow pipe from shaft to circulation pond and built into the shaft collar; and
    - establishment of water supply to the circulation ponds.

The plant and equipment likely to be used during the site establishment works include excavators, dozer, tippers, trucks, graders, vibratory rollers, compactor, asphalt pavers and water carts.

Each shaft site would be serviced with mains power. The power would be used to drive the drill, water recirculation pumps, welders, hand tools, etc.

In addition to the drilling rig and gantry itself, associated drilling plant and equipment comprises:

- 30 tonne excavator;

- 20 tonne loader;
- 110 tonne crane;
- compressor;
- welding machines, and
- water pumps.

10.2 Noise modelling methodology

Construction noise levels were modelled using Brüel & Kjær 'Predictor' software, as per the operational modelling.

Predicted noise levels over a typical worst case 15-minute scenario were modelled and assessed for comparison against the relevant NMLs. Noise predictions were undertaken assuming the meteorological conditions provided in Table 5.3 (ie for calm and noise-enhancing conditions).

10.3 Construction plant and equipment

The construction noise impact assessment has adopted sound power levels from the EMM noise database for plant and equipment items used on similar projects. Plant and equipment items, sound power levels and quantities adopted in the noise modelling are summarised in Table 10.1.

Table 10.1 Typical construction plant and equipment

Stage	Plant and equipment items	Quantity (worst case per 15-min period)[1]	A-weighted sound power level per item, dB
Site preparation works	Excavator	1	104
	Dozer	1	110
	Light vehicle	4	76
	FEL	1	105
	Road truck (deliveries)	1	103
	Dump truck	2	108
	Grader	1	108
	Roller	1	116
	Compactor	1	112
	Crane	1	102
	Forklift	1	106
	Water truck	1	96
	Generator	2	98
Drilling (standard hours)	Drill	1	102
	Hydraulic power pack	1	87
	Compressor	1	100
	Water circulation pumps	2	77
	Excavator	1	104
	Front end loader	1	105
	Crane	1	102

Table 10.1 Typical construction plant and equipment

Stage	Plant and equipment items	Quantity (worst case per 15-min period)[1]	A-weighted sound power level per item, dB
	Welding equipment	1	95
Drilling (outside standard hours)	Drill	1	102
	Hydraulic power pack	1	87
	Compressor	1	100
	Water circulation pumps	2	77

Notes: 1. Standard hours: Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm and no construction work on Sundays or public holidays.
2. Plant and equipment items have been assumed to operate continuously in any 15-minute period unless otherwise specified.

10.4 Construction noise modelling results

A summary of predicted construction noise emissions is provided in Table 10.2 for select representative assessment locations. The assessment locations nearest the proposed construction site are all located within NCA 4 and are all representative of typically rural locations. Hence, minimum construction noise NMLs have been applied.

Table 10.2 Predicted construction noise levels – noise-enhancing conditions

Location	Predicted construction noise, $L_{Aeq,15min}$, dB					
	TSC1			TSC2		
	Site Est. (Standard hours)	Drilling (Standard hours)	Drilling (Outside standard hours)	Site Est. (Standard hours)	Drilling (Standard hours)	Drilling (Outside standard hours)
215 Charlies Point Rd	58	48	39	62	52	44
185 Charlies Point Rd	67	57	44	66	56	50
80 Charlies Point Rd	52	42	<35	51	41	<35
Nearest on Great Southern Rd	45	35	<35	42	<35	<35
70 Warrobyn Rd	48	38	<35	52	42	<35
Nearest on Ironbark Rd	42	<35	<35	41	<35	<35
Nearest on Remembrance Dr	46	36	<35	43	<35	<35
NML ($L_{Aeq,15\ minute}$, dB)	**40 75 highly affected**	**40 75 highly affected**	**35**	**40 75 highly affected**	**40 75 highly affected**	**35**

Notes: Standard hours are Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm and no work on Sundays or Public Holidays.

Construction noise levels are predicted to be above the NML but below the highly noise affected level for all works during standard construction hours. This is not an uncommon finding for construction projects. Further, given that the predictions assume noise-enhancing conditions as well as simultaneous operation of plant and equipment, it is likely that actual construction noise levels would be less than those predicted for most of the time. Notwithstanding, noise mitigation measures and application of good practice noise management have been considered. Noise mitigation and management measures are discussed below.

Construction noise levels outside of standard hours are predicted to be above the NML at the two nearest privately-owned residences on Charlies Point Road. It is noted that Tahmoor Coal has commenced negotiations with the owners of both of these properties.

Noise from the out-of-hours activity will generally be continuous in nature and therefore given the magnitude of predicted L_{Aeq} construction noise levels, the maximum noise level (ie L_{Amax}) from this activity is likely to be below the relevant sleep disturbance screening criteria at all nearby assessment locations.

Tahmoor Coal will manage construction noise levels where exceedances of NMLs have been identified. The construction noise management methods will be detailed in a construction noise management plan which will be developed prior to commencement of construction activities and include, but not be limited to, the following:

- a detailed assessment of feasible and reasonable work practices that will be implemented to minimise noise impacts;
- strategies to promptly deal with and address noise complaints;
- procedures for notifying nearby residents of forthcoming works that are likely to produce noise impacts; and
- consideration of respite periods.

The ICNG recommends the following where NMLs are predicted to be exceeded:

- application of feasible and reasonable work practices to minimise noise;
- inform potentially impacted residents of the nature of the works to be carried out, expected noise levels and duration and relevant contact details; and
- negotiation with the community where noise from work outside standard hours is predicted to exceed the relevant NML by more than 5 dB.

Tahmoor Coal shall manage construction noise from the site by adopting work practices such as:

- constructing during ICNG standard hours only where practicable;
- regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration;
- avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon residents;
- parking of vehicles in locations and ways to minimise noise;
- minimising the need for vehicle reversing for example, by arranging for one-way site traffic routes (largely achieved by site layout design);
- use of broadband audible reverse alarms on vehicles and elevated work platforms used on site; and
- minimising the movement of materials and plant and unnecessary metal-on-metal contact.

11 Vibration assessment

The potential for impacts from vibration has been assessed for construction activity associated with the TSP. Vibration from operational activity is not expected to change and given the separation distance between the site and the nearest residence (>200 m), ground-borne vibration from equipment operating at the pit-top is not expected to be perceptible.

As a guide, safe working distances for typical items of vibration intensive plant are listed in Table 11.1. The safe working distances are quoted for both "Cosmetic Damage" (refer to British Standard BS 7385) and "Human Comfort" (refer to Assessing Vibration: a technical guideline (DEC 2006) and British Standard BS 6472-1).

Table 11.1 Recommended safe working distances for vibration intensive plant

Plant item	Rating/Description	Safe working distance	
		Cosmetic damage (BS 7385)	Human response (BS 6472)
Vibratory roller	<50kN (Typically 1-2 tonnes)	5 m	15 to 20 m
	<100kN (Typically 2-4 tonnes)	6 m	20 m
	<200kN (Typically 4-6 tonnes)	12 m	40 m
	<300kN (Typically 7-13 tonnes)	15 m	100 m
	>300kN (Typically 13-18 tonnes)	20 m	100 m
	>300kN (>18 tonnes)	25 m	100 m
Small hydraulic hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium hydraulic hammer	(900 kg - 12 to 18t excavator)	7 m	23 m
Large hydraulic hammer	(1600 kg - 18 to 34t excavator)	22 m	73 m
Vibratory pile driver	Sheet piles	2 m to 20 m	20 m
Pile boring	≤ 800 mm	2 m (nominal)	4 m
Jackhammer	Hand held	1 m (nominal)	2m

Source: From NSW Roads and Maritime Services Construction Noise and Vibration Guideline, August 2016.

The safe working distances presented in Table 11.1 are indicative and will vary depending on the particular item of plant and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions.

In relation to human comfort (response), the safe working distances relate to continuous vibration and apply to residential receivers. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods are allowed, as discussed in BS 6472-1.

Based on the safe working distances for typical plant items in Table 11.1 and the location of surrounding privately owned residential properties, it is unlikely that human response vibration criteria will be exceeded. Privately-owned assessment locations are generally greater than 170 m away from any likely construction activity, which is greater than the maximum safe working distance of 100 m for an 18 tonne (or greater) vibratory roller. Because human response criteria are more stringent than cosmetic damage criteria, it is also highly likely that cosmetic damage criteria would be satisfied at privately owned residential properties. The exception to this is the residence at 185 Charlies Point Road; vibration intensive construction plant may operate within approximately 30 m of this residence when site establishment activities occur for TSC1.

It is noted that Tahmoor Coal have commenced consultation with the resident at 185 Charlies Point Road. Tahmoor Coal will monitor and manage construction noise and vibration, which will include preparing a construction noise and vibration management plan.

12 Conclusion

EMM has prepared this noise and vibration assessment in accordance with the requirements of the DPE as provided in the SEARs (refer Table 1.1). A summary of the key findings is provided as follows.

Operational noise emissions from the existing Tahmoor mine were predicted including consideration of relevant modifying factors for noise characteristics as per the INP, particularly in relation to low frequency noise emissions. Noise from the existing Tahmoor mine were found to be above the relevant PSNLs at a number of assessment locations (refer results table presented in Appendix C). It is of note that existing mine noise emissions are generally in compliance with the current noise criteria for the site.

The INP Application Notes state that if PSNLs are not achieved from existing operations, a preliminary review of feasible and reasonable mitigation measures should be undertaken to identify potential opportunities to reduce existing operational noise levels.

An assessment of feasible and reasonable mitigation measures was undertaken and those that were determined to be feasible and reasonable were incorporated into the noise model for the TSP. A summary of the number of assessment locations affected by mine noise emissions above the relevant PSNL is provided. Under noise-enhancing weather conditions it is predicted that up to 19 properties would be affected by noise emissions more than 5 dB above the PSNL during the night-time period, which is a significant reduction from 127 for existing Tahmoor mine operations.

The noise emissions from the TSP are predicted to reduce compared to existing Tahmoor Mine operational noise emissions at almost all noise-sensitive receptors during the day and evening periods and, importantly, most significantly during the night-time period at all noise-sensitive receptors. As per the results presented in Appendix C, mine noise with the mitigated TSP operations as proposed is expected to be lower compared to existing levels by at least 2 dB and up to 9 dB at all assessment locations during the night-time period. Mine noise with the mitigated TSP during the day and evening periods is expected to be lower by up to 6 dB compared to existing levels at all but two assessment locations. The exceptions to this are the residences at 185 and 215 Charlies Point Road as a result of the southern extension to the REA and the new ventilation fans. Predicted noise levels at these two properties are 40 dB and 39 dB (ie 5 dB and 4 dB above PSNLs, respectively). It is noted that negotiations between Tahmoor Coal and these two residences has commenced.

Mine noise at the Anglican Church and school are predicted to achieve the relevant internal amenity noise levels.

A summary of the number of assessment locations in each noise impact category in accordance with Table 1 of the VLAMP has been provided. The figure provided in Appendix E shows the assessment locations categorised as significant, moderate, marginal or negligible.

Tahmoor Coal will continue to investigate options for further noise mitigation into the future including, but not limited to, the following:

- consideration of a new haul truck for use in the REA with the inclusion of noise attenuation and/or noise specification in the supply contract;
- additional investigations regarding mitigation for the CHPP; and
- consideration of noise mitigation initiatives in the purchase and/or design of all new equipment as well as any new site buildings and access roads.

Achievable noise levels at locations consistent with the current noise compliance monitoring locations have been provided.

Based on the results of operator-attended noise surveys undertaken by EMM in Olive Lane, existing maximum noise levels from Tahmoor Mine are in the order of L_{Amax} 53 dB at residences from general dozer activity or loading coal into wagons. Based on a partially open window this would equate to an approximate internal noise level of L_{Amax} 43 dB. Although this external level is above the relevant screening criteria, the calculated internal noise levels are well below those that are likely to cause awakening reactions.

Maximum noise levels from existing operations have previously been the subject of a PRP. Engineered mitigation controls have been effectively implemented as part of the Tahmoor Mine's PRPs to reduce and control maximum noise events. In addition, the noise reduction measures proposed as part of the TSP will also have the effect of further reducing maximum noise levels from site. It is expected that both the frequency and level of maximum noise events from the TSP will be lower compared to the existing operation.

Road traffic noise associated with construction and operation of the TSP is predicted to satisfy the requirements of the RNP. Hence, the TSP is not expected to generate road traffic noise impacts at the nearest potentially affected receivers.

Construction noise and vibration has been predicted and assessed in accordance with the ICNG and *Assessing Vibration: a technical guideline*.

Construction noise levels are predicted to be above the relevant NML at some locations but below the highly noise affected level for all works during standard construction hours at all assessment locations. This is not an uncommon finding for construction projects. Noise mitigation measures and application of good practice noise management have been considered and outlined in this report.

Construction noise levels outside of standard hours are predicted to be above the NML at the two nearest privately-owned residences on Charlies Point Road (although it is noted that negotiations have commenced with owners of these two properties).

Noise from the out-of-hours activity will generally be continuous in nature and therefore given the magnitude of predicted L_{Aeq} construction noise levels, the maximum noise level (ie L_{Amax}) from this activity is likely to be below the sleep disturbance screening criteria (L_{Amax} 52 dB as provided in the NPfI) at all nearby assessment locations.

Tahmoor Coal will manage construction noise levels where exceedances of NMLs have been identified. The construction noise management methods will be detailed in a construction noise management plan which will be developed prior to commencement of construction activities.

In relation to construction related vibration, based on the safe working distances for typical plant items and the location of surrounding privately owned residential properties, it is unlikely that human response vibration criteria will be exceeded. Since human response criteria are more stringent than cosmetic damage criteria, it is also highly likely that cosmetic damage criteria would be satisfied at privately owned residential properties. The exception to this is the residence at 185 Charlies Point Road. It is noted that Tahmoor Coal have commenced consultation with the resident at 185 Charlies Point Road.

Tahmoor Coal will monitor and manage construction noise and vibration, which will include preparing a construction noise and vibration management plan.

References

NSW Environment Protection Authority (EPA) 2000, *NSW Industrial Noise Policy* (INP)

NSW Environment Protection Authority (EPA) 2017, *Noise Policy for Industry*

NSW Government 2018, *Voluntary Land Acquisition and Mitigation Policy For State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP);

NSW EPA 2013, *Rail Infrastructure Noise Guideline* (RING)

NSW Department of Environment Climate Change and Water (DECCW) 2011, *Road Noise Policy* (RNP)

NSW Environmental Protection Authority (EPA) 2009, *The Interim Construction Noise Guideline* (ICNG)

Department of Environment and Conservation NSW 2006, *Assessing Vibration: a technical guideline*

BS 6472 – 2008 *"Evaluation of human exposure to vibration in buildings (1-80Hz)"*

German Standard DIN 4150 Part 2 1975

Australian Standard AS 2187.2 - 2006 "*Explosives* - Storage *and Use - Use of Explosives*"

BS 7385 Part 2-1993 *"Evaluation and measurement for vibration in buildings Part 2*"

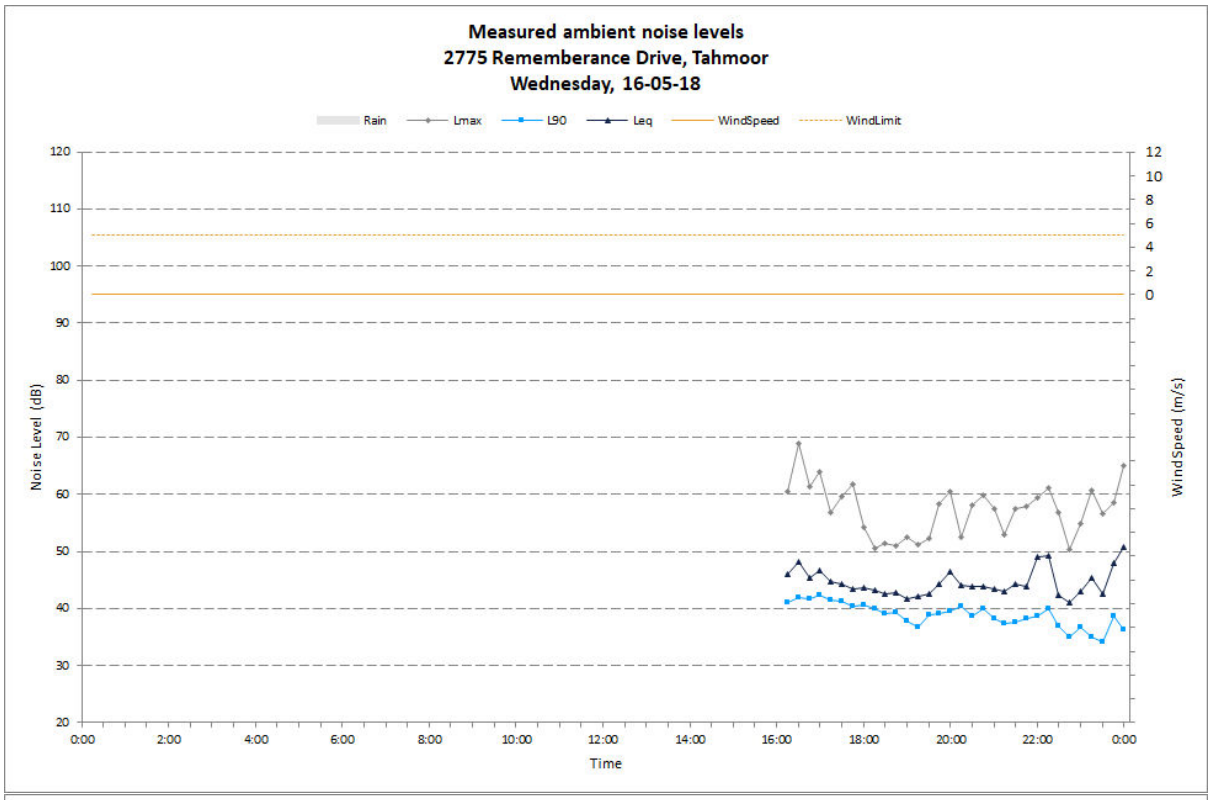
Appendix A

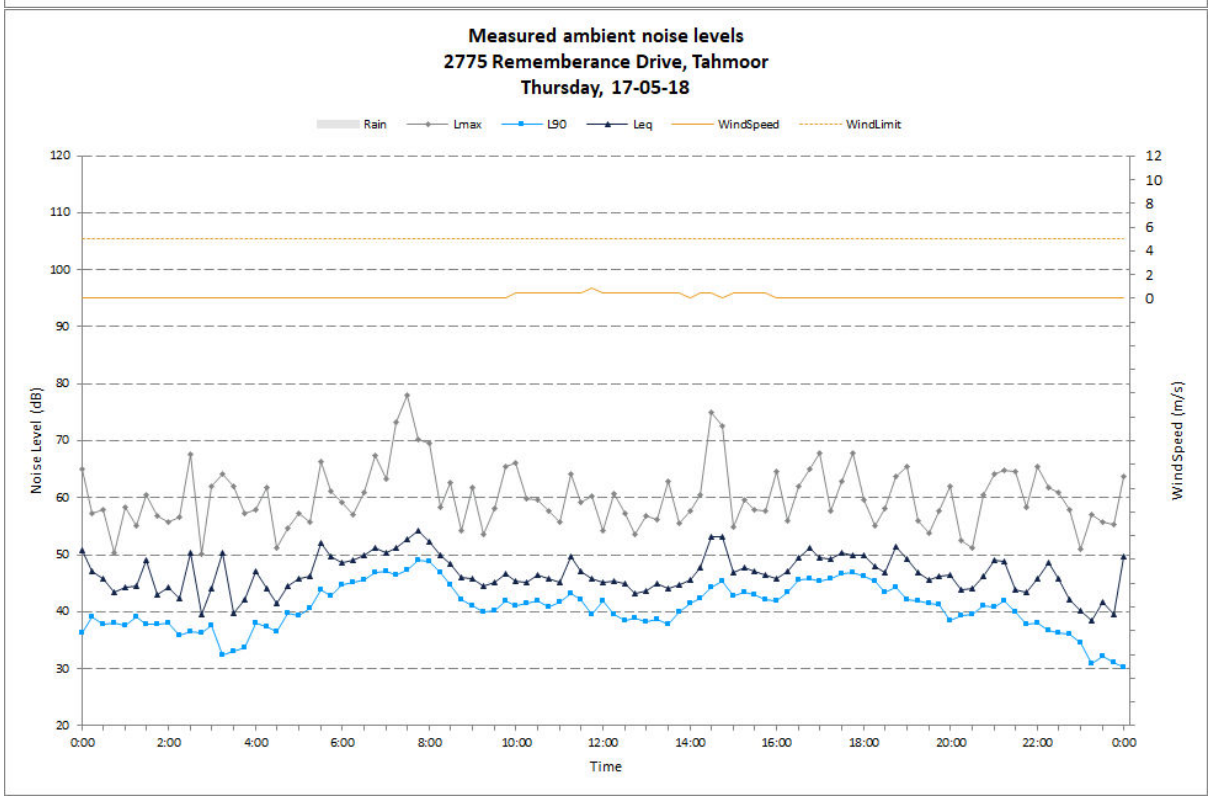
Existing ambient noise monitoring results

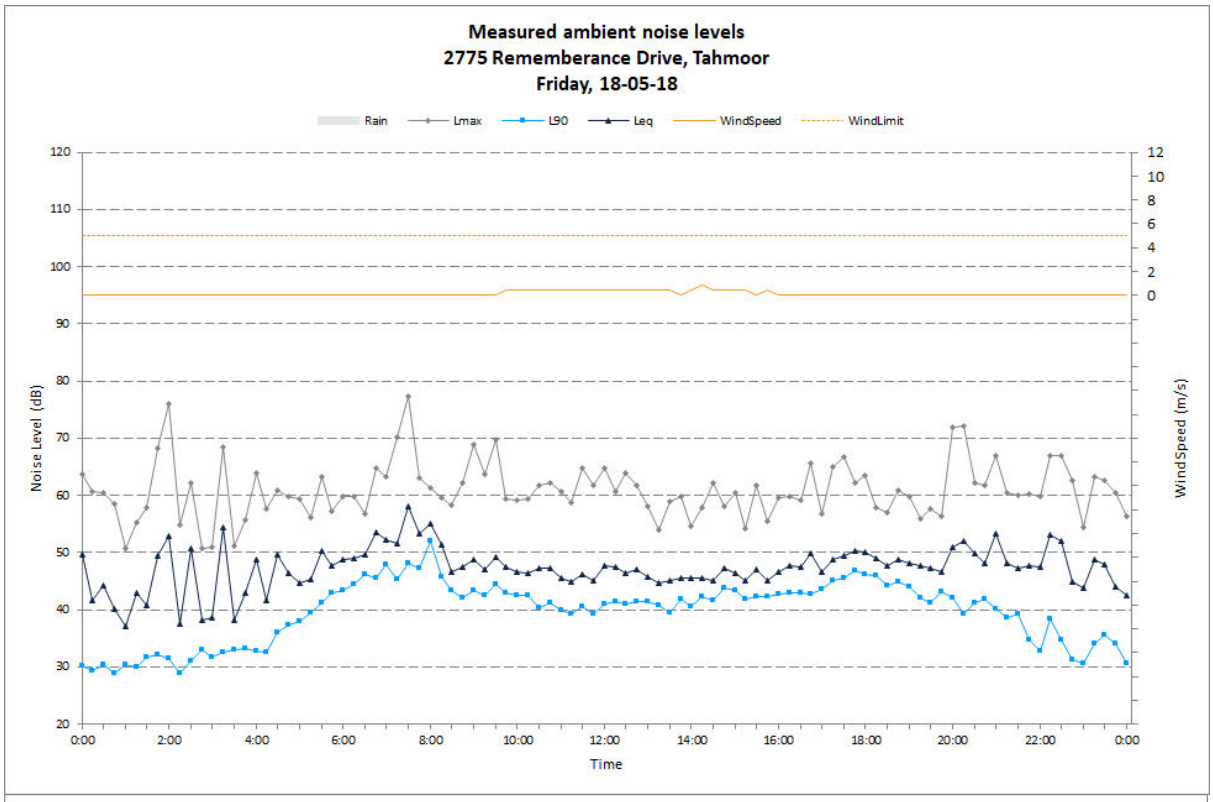
Table A.1 Summary of daily noise logging results –2775 Rememberance Drive, Tahmoor

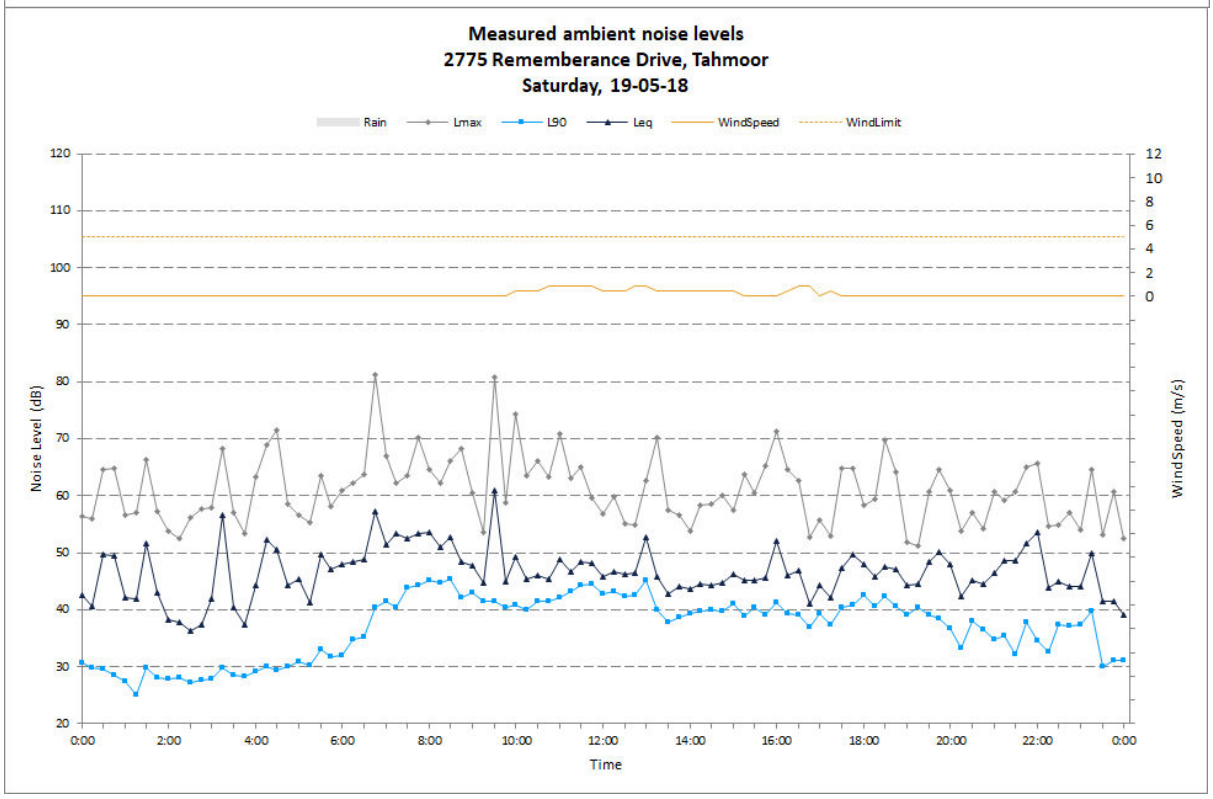
Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,11\ hour}$, dB (Day)	$L_{Aeq,4\ hour}$, dB (Evening)	$L_{Aeq,9\ hour}$, dB (Night)
Wednesday, 16-05-18	0	37	34	0	44	47
Thursday, 17-05-18	39	38	30	49	47	48
Friday, 18-05-18	40	35	28	49	49	49
Saturday, 19-05-18	39	33	25	50	48	45
Sunday, 20-05-18	38	38	33	49	46	45
Monday, 21-05-18	45	37	32	52	46	45
Tuesday, 22-05-18	43	37	29	49	46	45
Wednesday, 23-05-18	39	37	30	49	47	49
Thursday, 24-05-18	38	35	34	49	42	45
Friday, 25-05-18	38	37	28	47	47	45
Saturday, 26-05-18	39	39	31	48	48	43
Sunday, 27-05-18	39	34	30	47	46	46
Monday, 28-05-18	38	37	33	49	46	46
Tuesday, 29-05-18	0	0	0	0	0	0
Overall	**39**	**37**	**30**	**49**	**47**	**46**

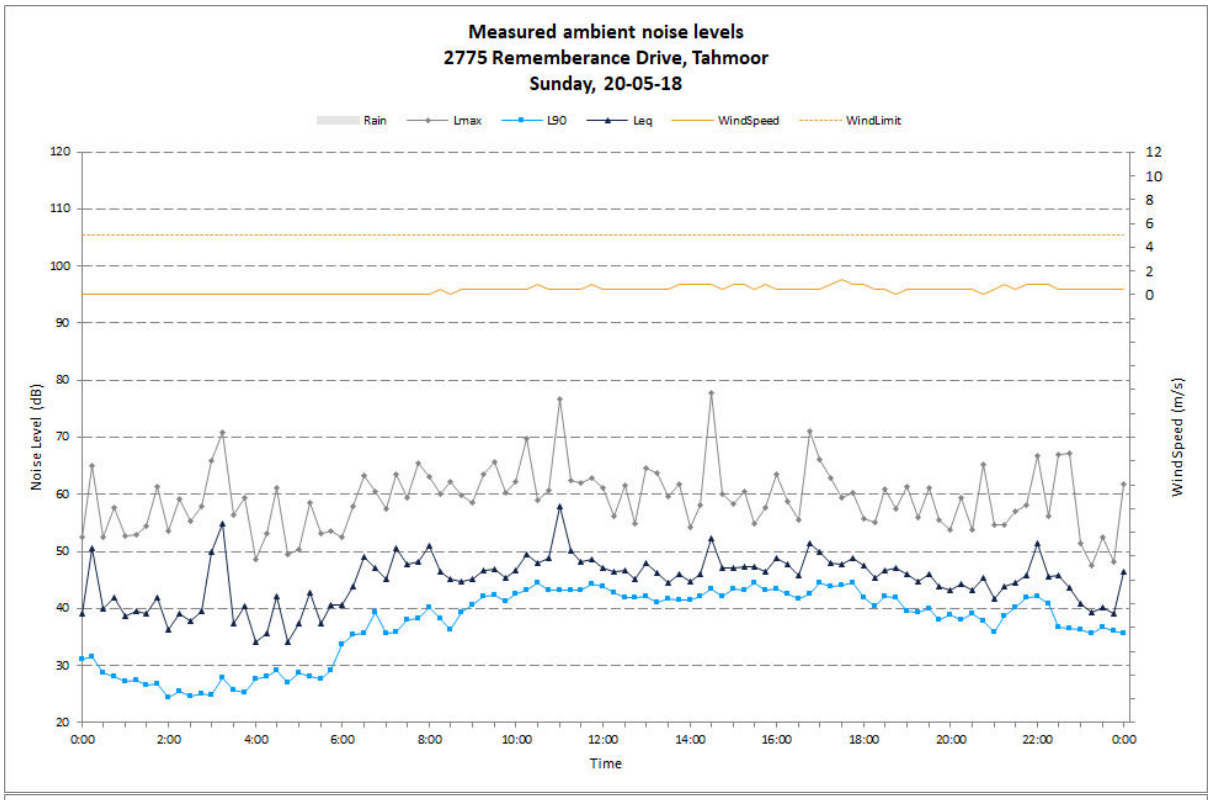
Notes: "0" indicates periods with too few valid samples due to weather or logger operation

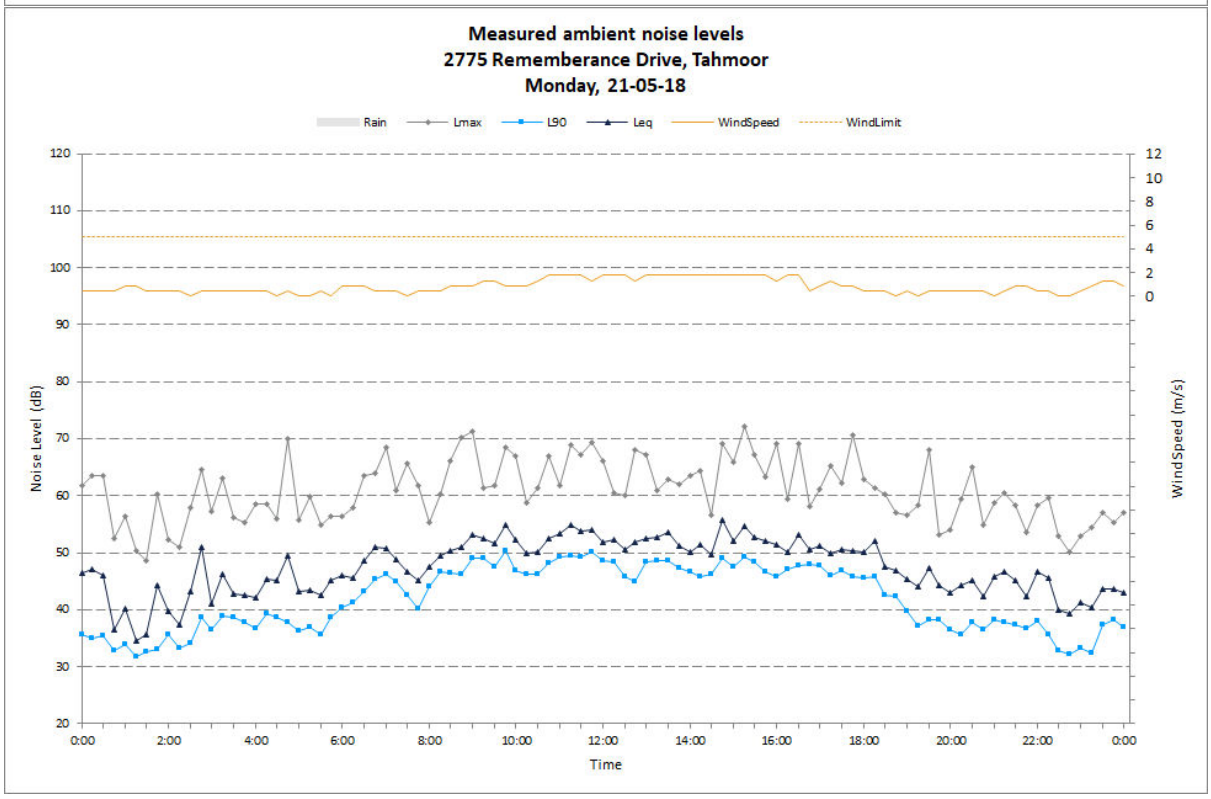

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Wednesday, 16-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

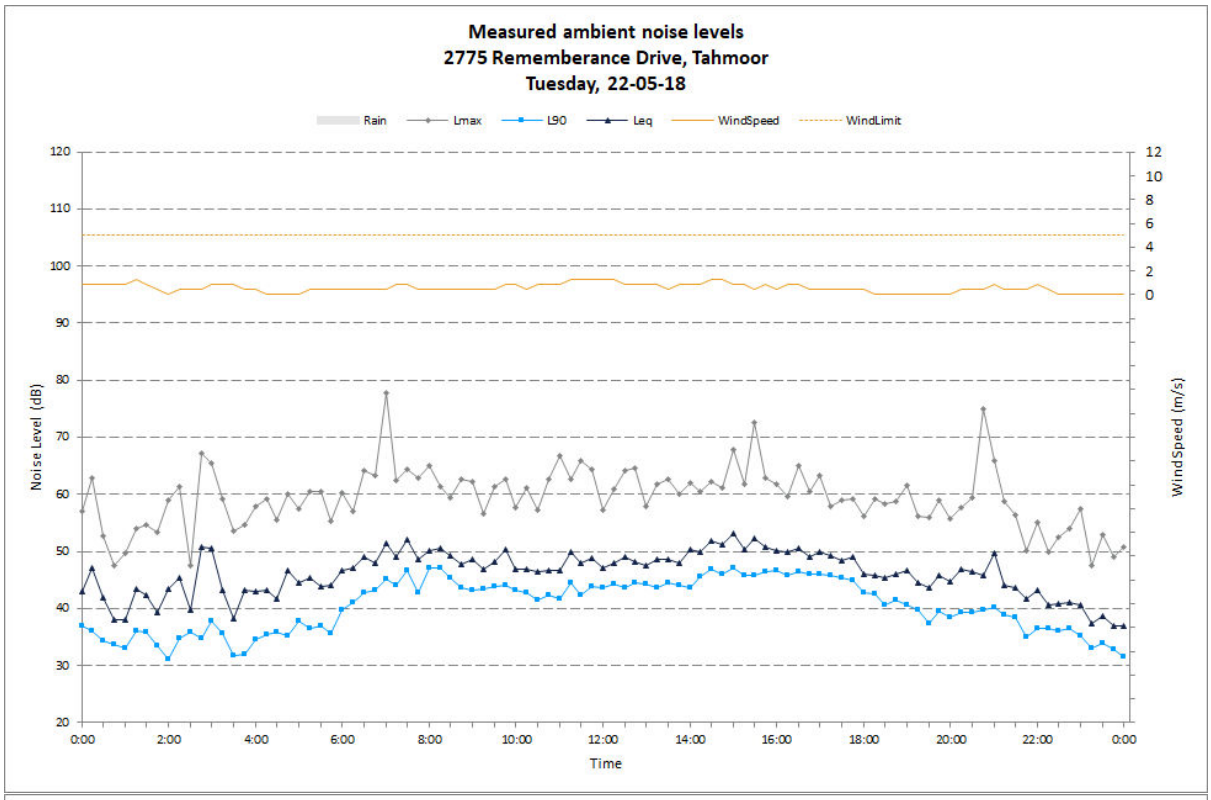

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Thursday, 17-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

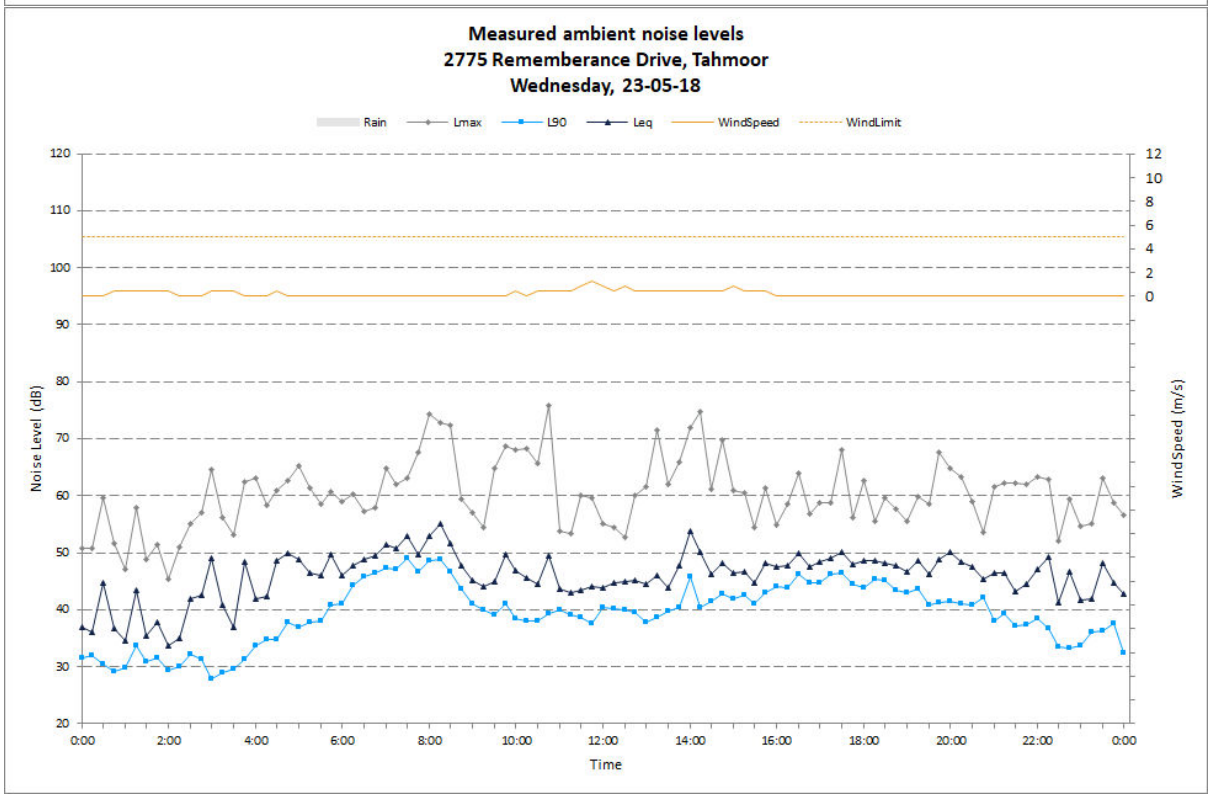

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Friday, 18-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

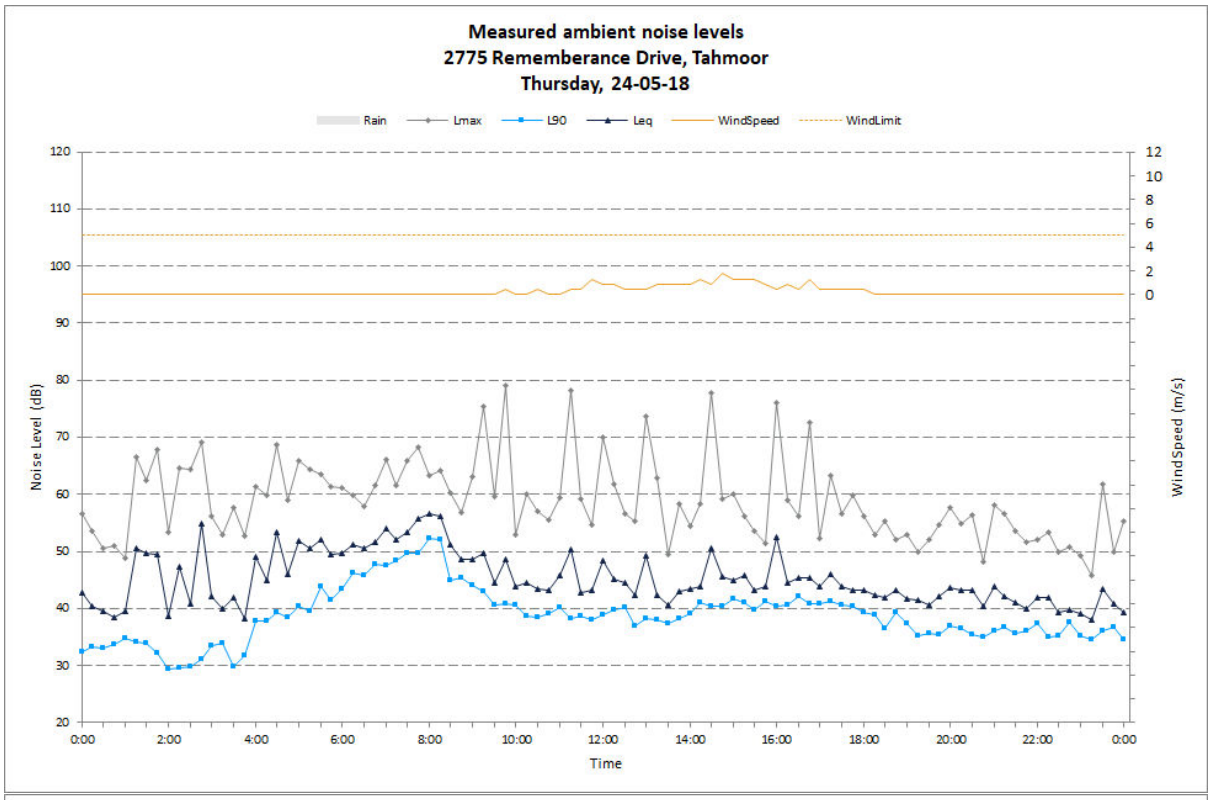

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Saturday, 19-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

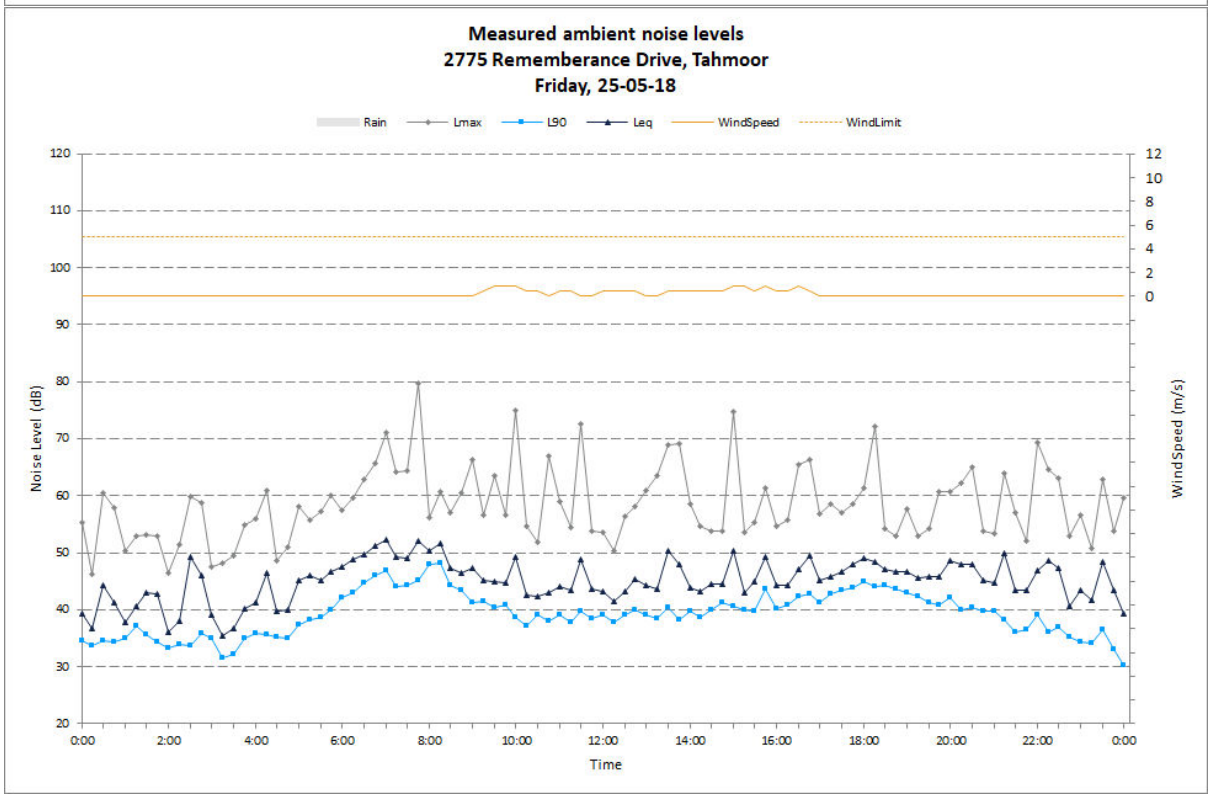

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Sunday, 20-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

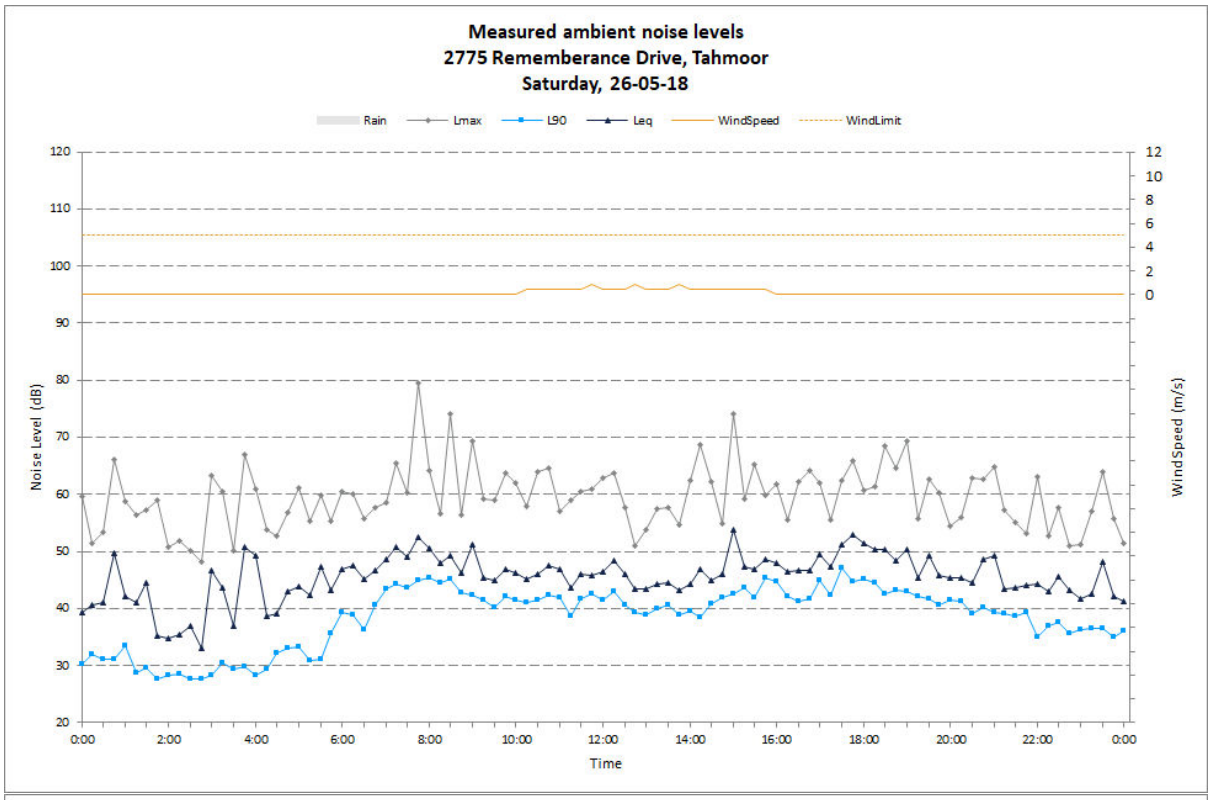

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Monday, 21-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

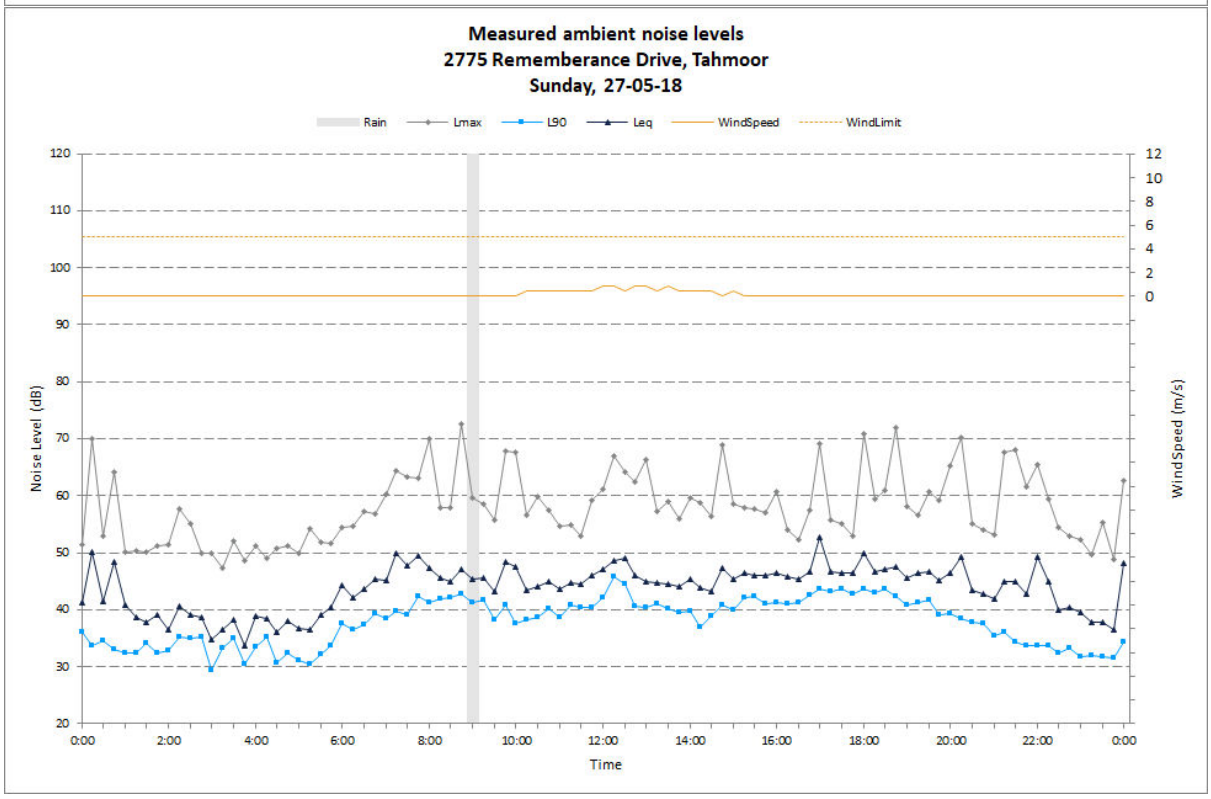

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Tuesday, 22-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

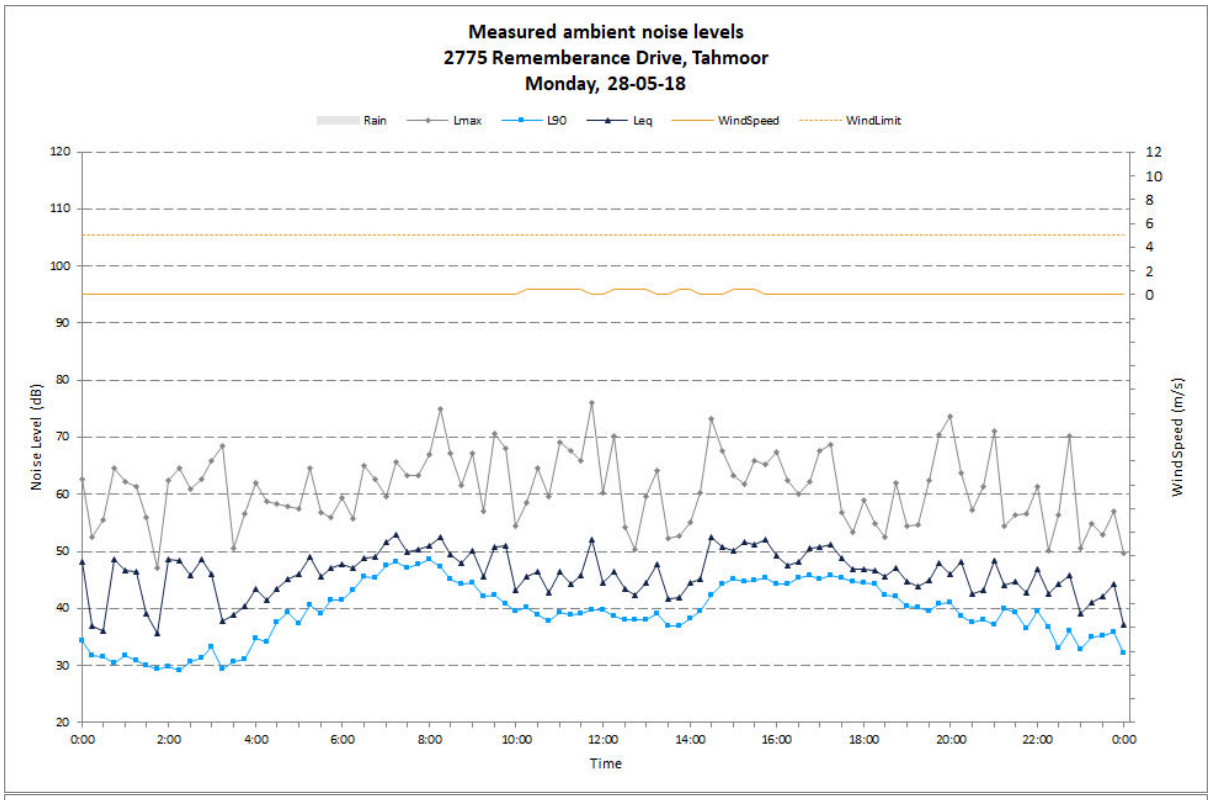

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Wednesday, 23-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Thursday, 24-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Friday, 25-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Saturday, 26-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Sunday, 27-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Monday, 28-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

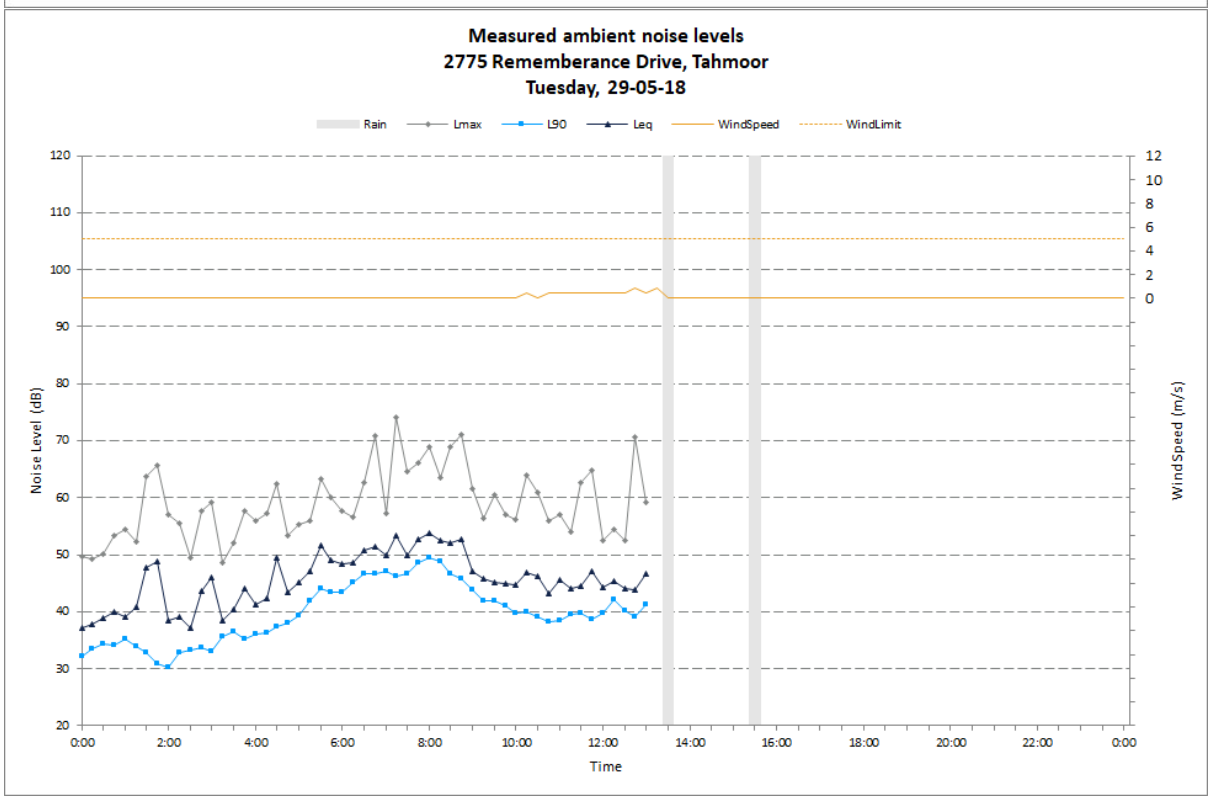
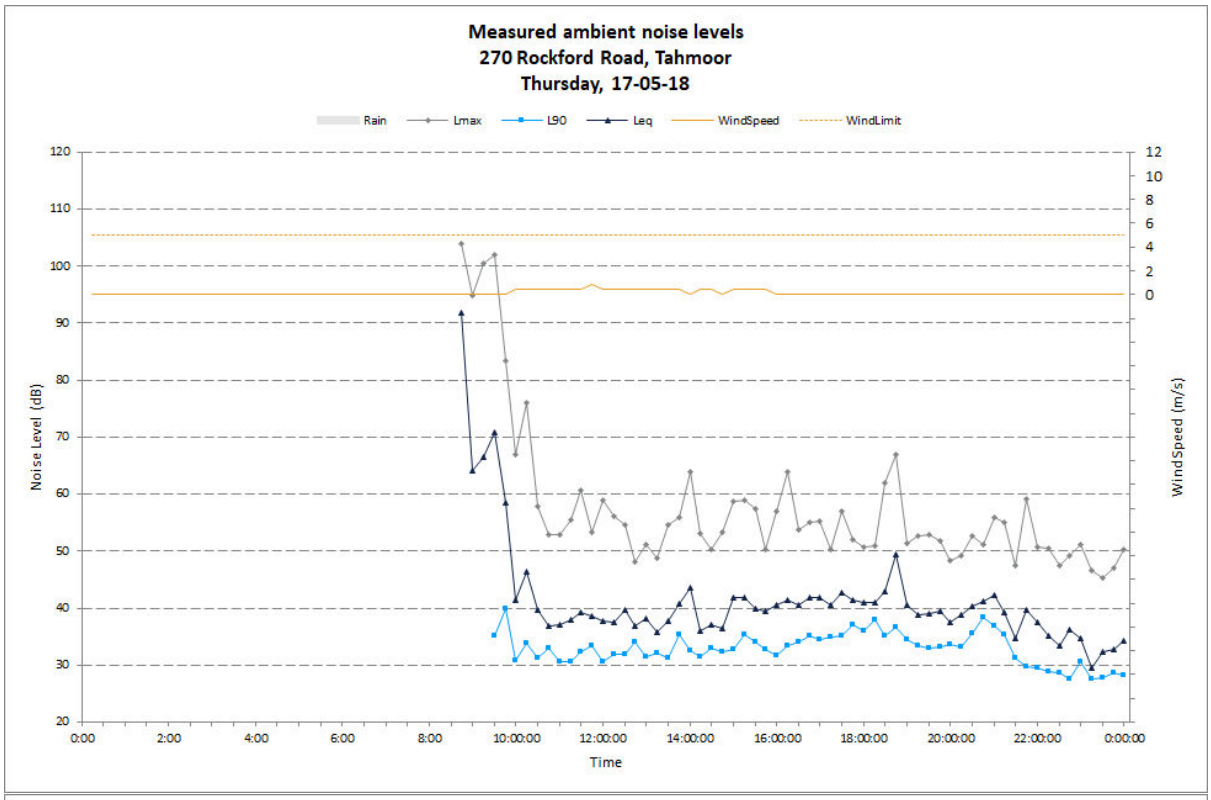
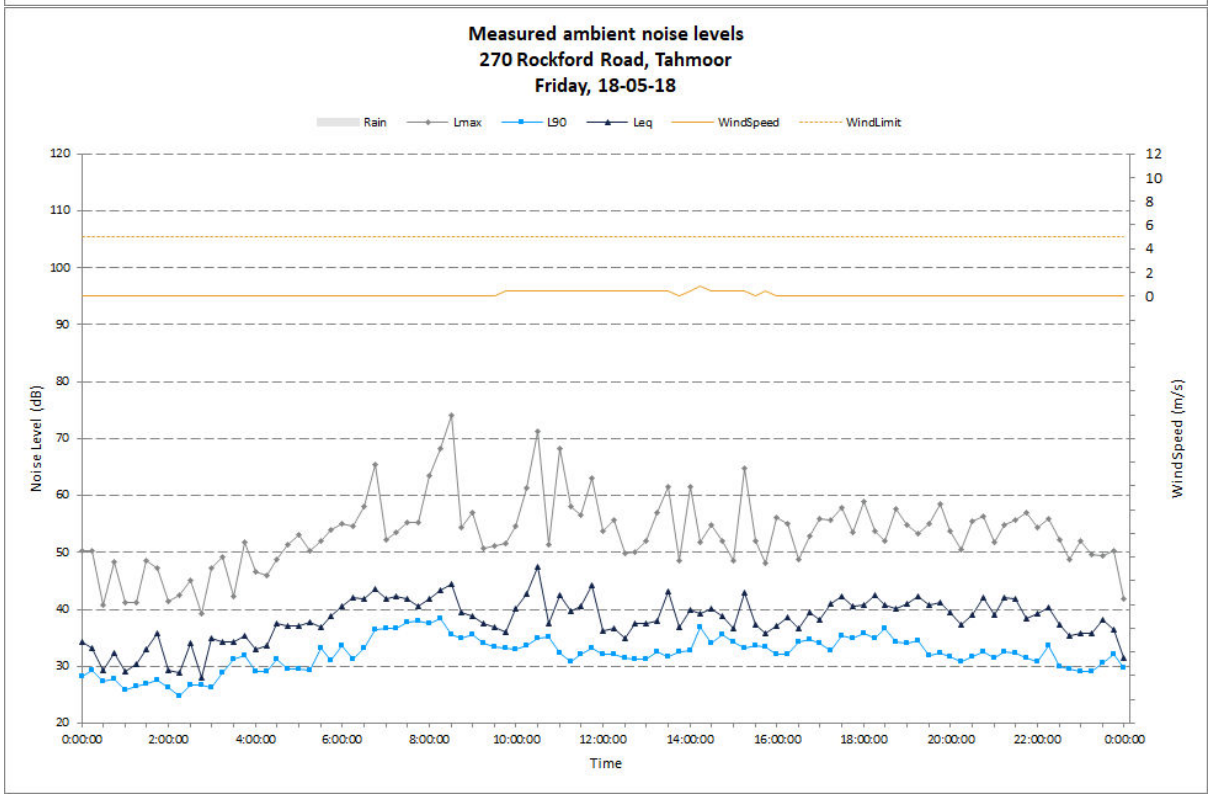

Measured ambient noise levels
2775 Rememberance Drive, Tahmoor
Tuesday, 29-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

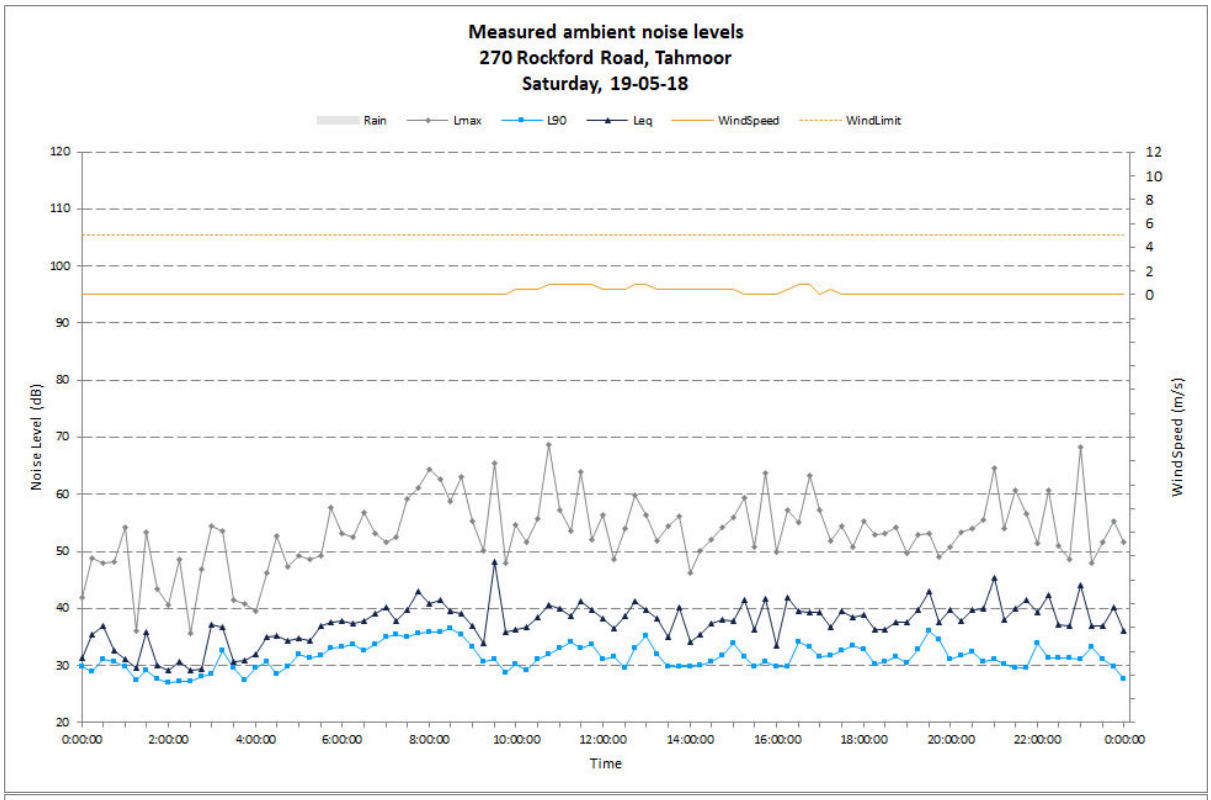
Table A.2 Summary of daily noise logging results –270 Rockford Road, Tahmoor

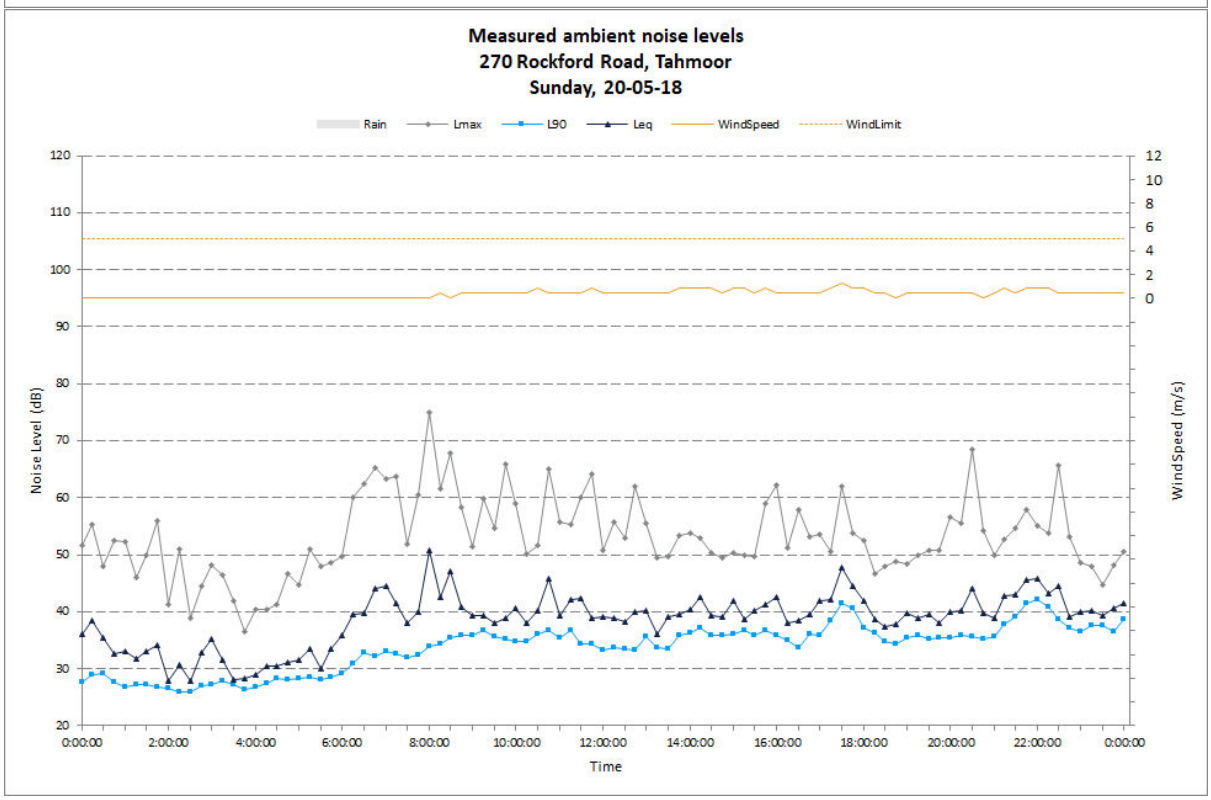
Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,11\ hour}$, dB (Day)	$L_{Aeq,4\ hour}$, dB (Evening)	$L_{Aeq,9\ hour}$, dB (Night)
Thursday, 17-05-18	0	30	26	0	42	37
Friday, 18-05-18	32	31	28	41	41	36
Saturday, 19-05-18	30	30	27	40	40	37
Sunday, 20-05-18	33	35	35	42	42	40
Monday, 21-05-18	37	32	31	51	41	42
Tuesday, 22-05-18	35	33	32	43	42	39
Wednesday, 23-05-18	29	29	27	44	39	38
Thursday, 24-05-18	29	29	29	42	35	37
Friday, 25-05-18	28	33	26	38	40	37
Saturday, 26-05-18	30	30	26	42	41	35
Sunday, 27-05-18	30	27	27	41	38	38
Monday, 28-05-18	29	28	28	42	38	37
Tuesday, 29-05-18	0	0	0	0	0	0
Overall	**30**	**30**	**27**	**44**	**40**	**38**

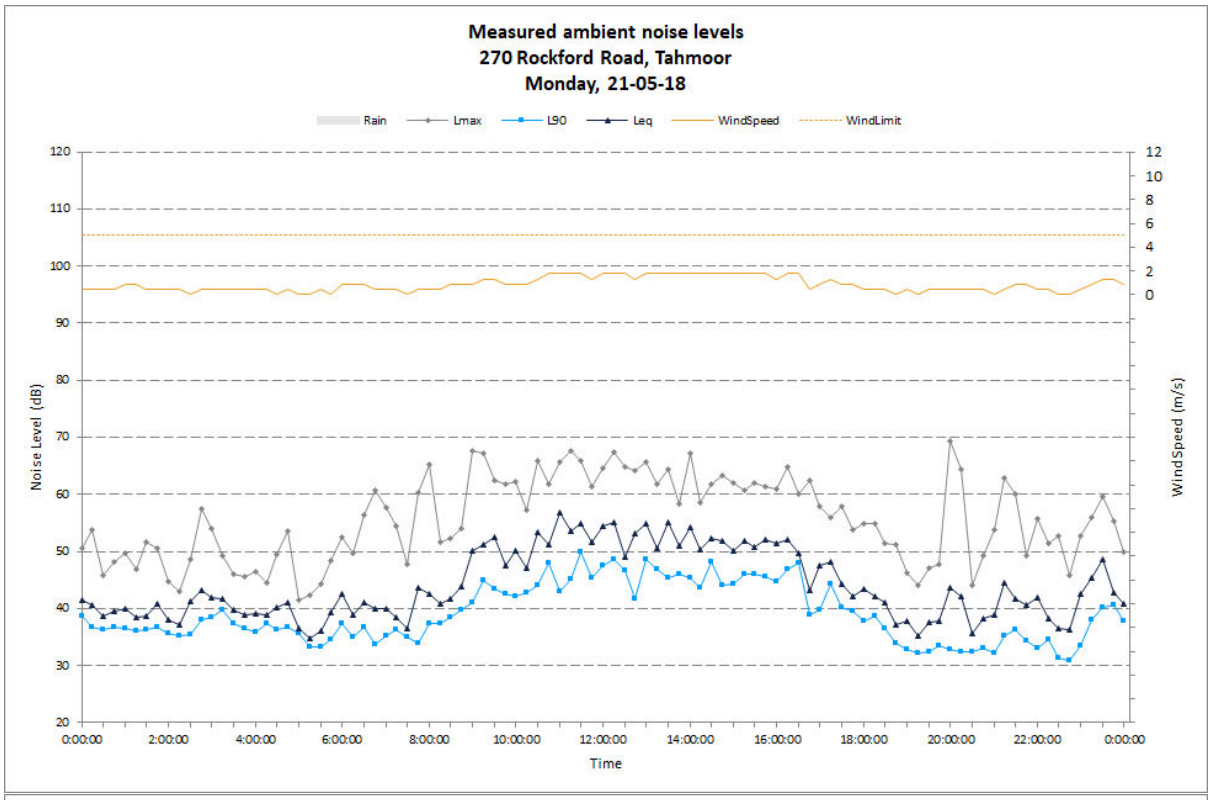
Notes: "0" indicates periods with too few valid samples due to weather or logger operation

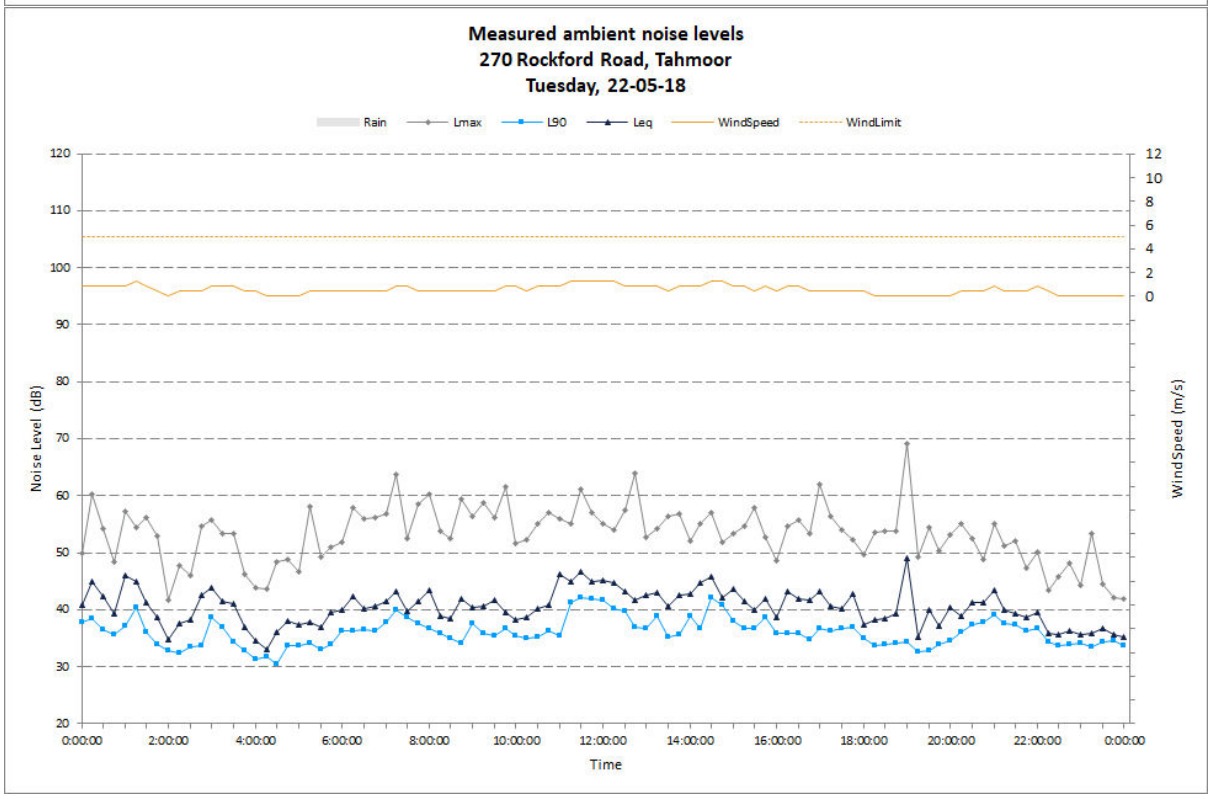

Measured ambient noise levels
270 Rockford Road, Tahmoor
Thursday, 17-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

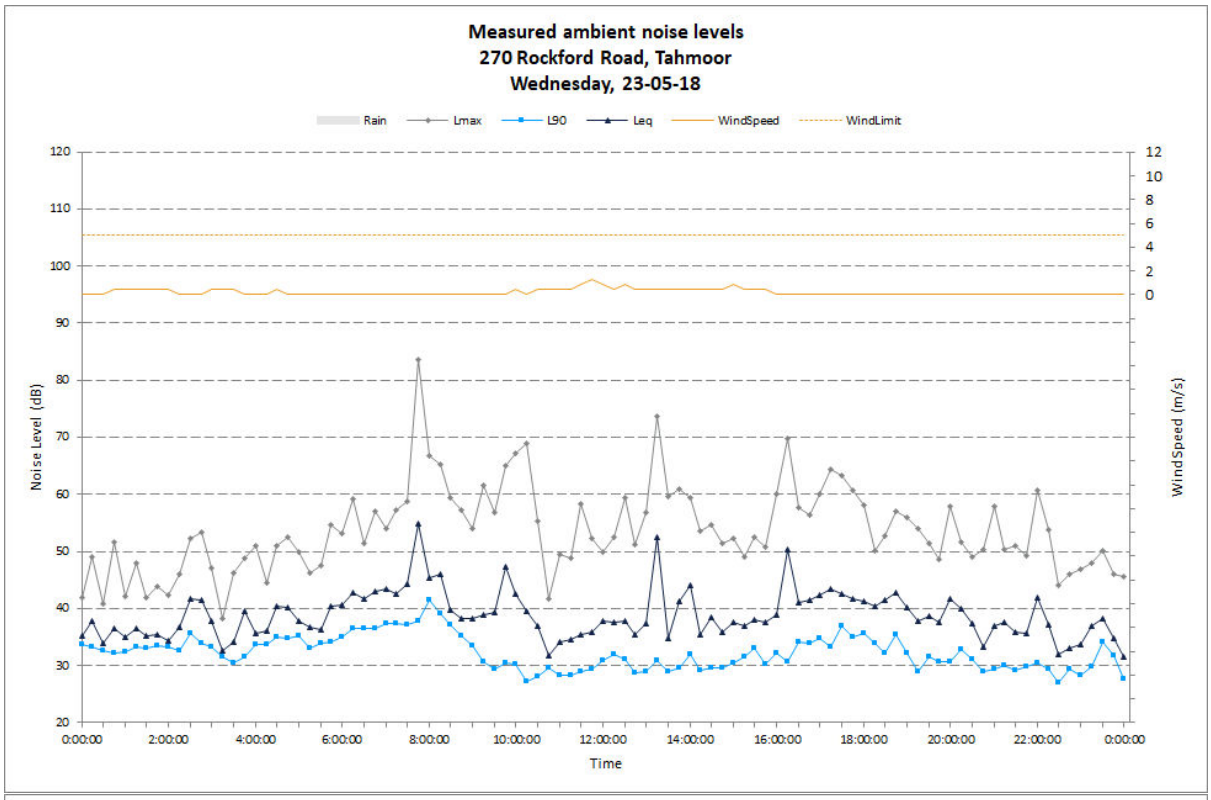

Measured ambient noise levels
270 Rockford Road, Tahmoor
Friday, 18-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

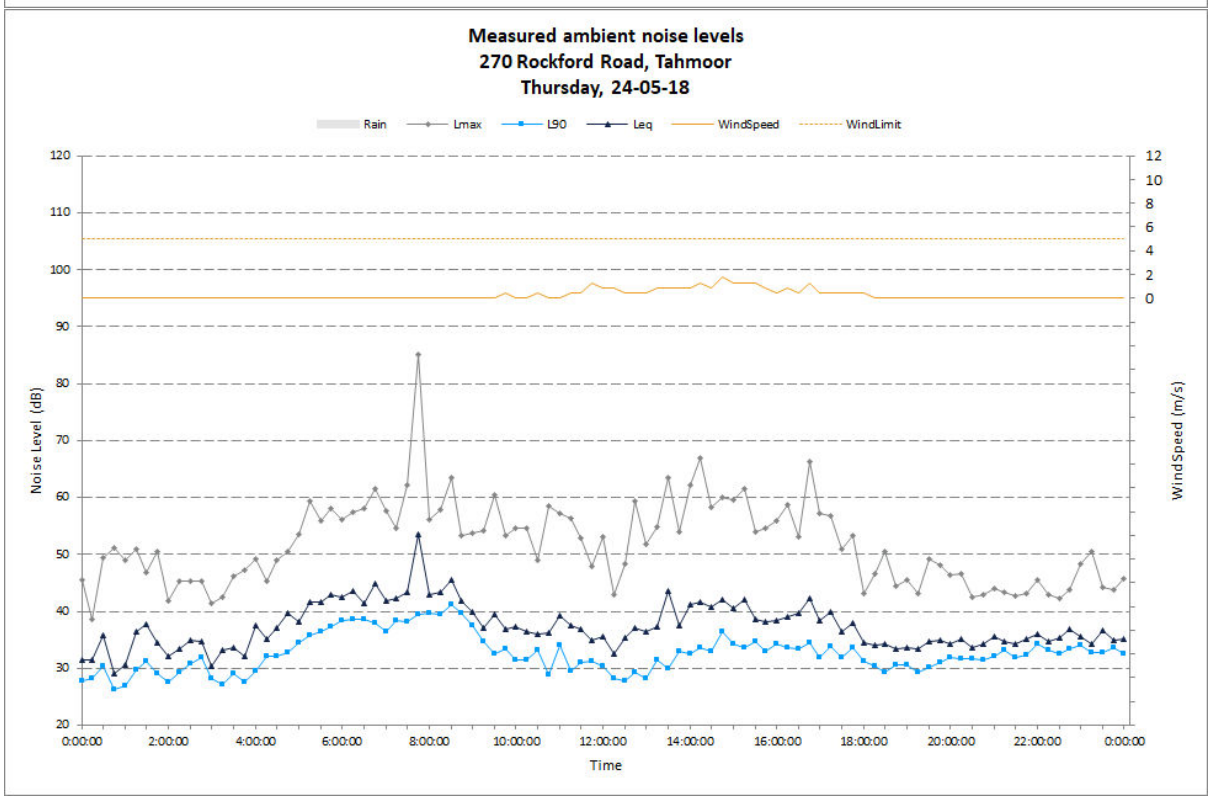

Measured ambient noise levels
270 Rockford Road, Tahmoor
Saturday, 19-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

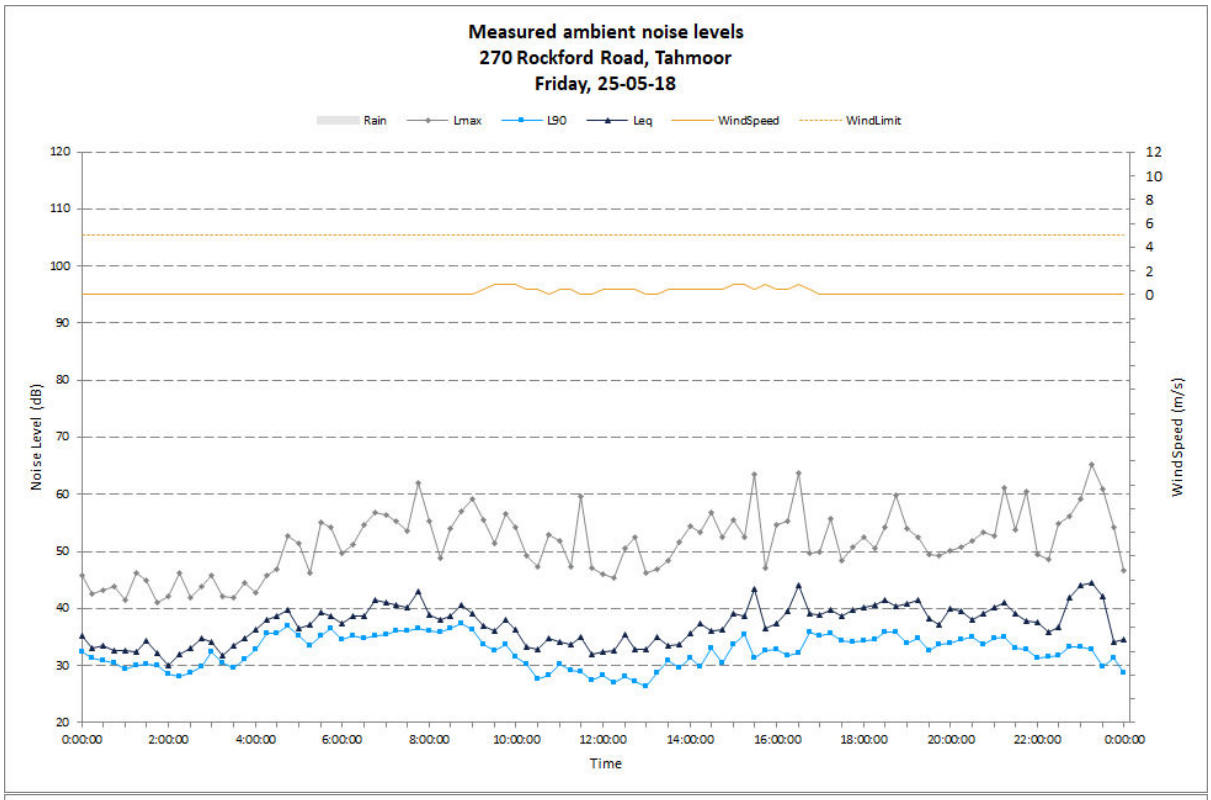

Measured ambient noise levels
270 Rockford Road, Tahmoor
Sunday, 20-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

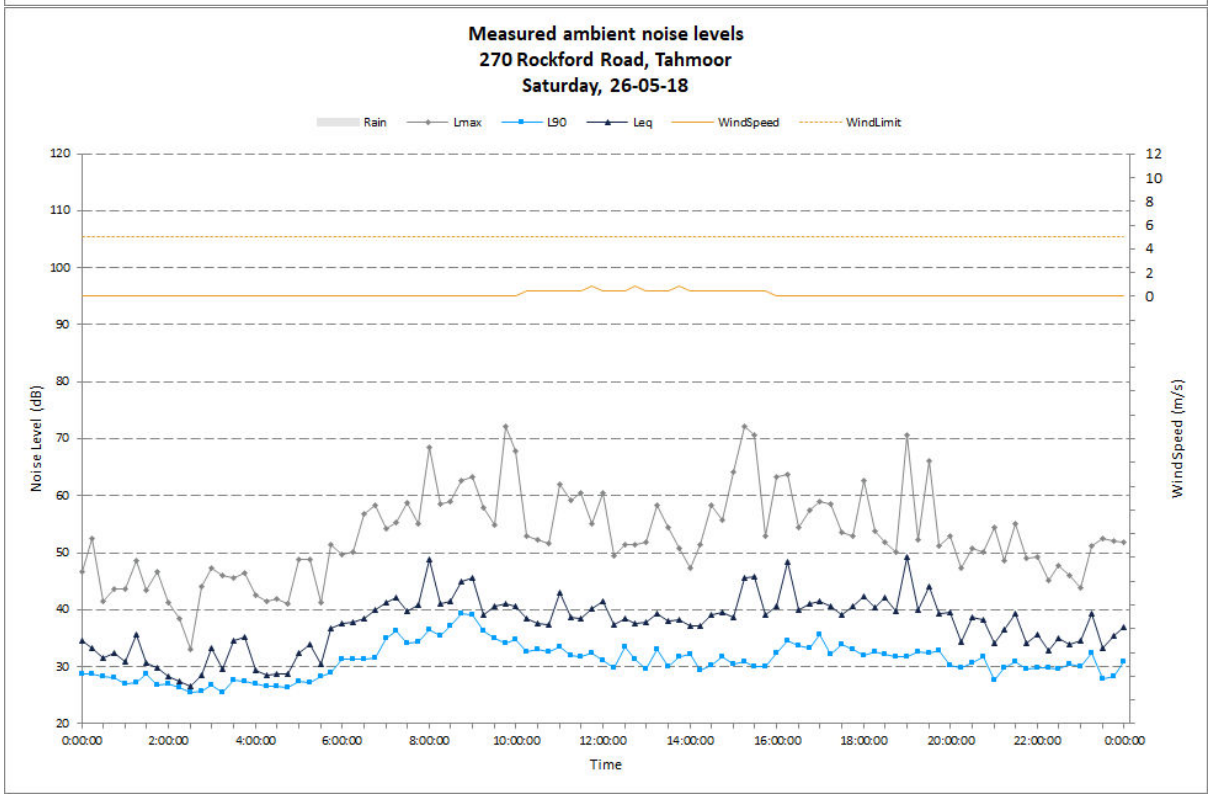

Measured ambient noise levels
270 Rockford Road, Tahmoor
Monday, 21-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

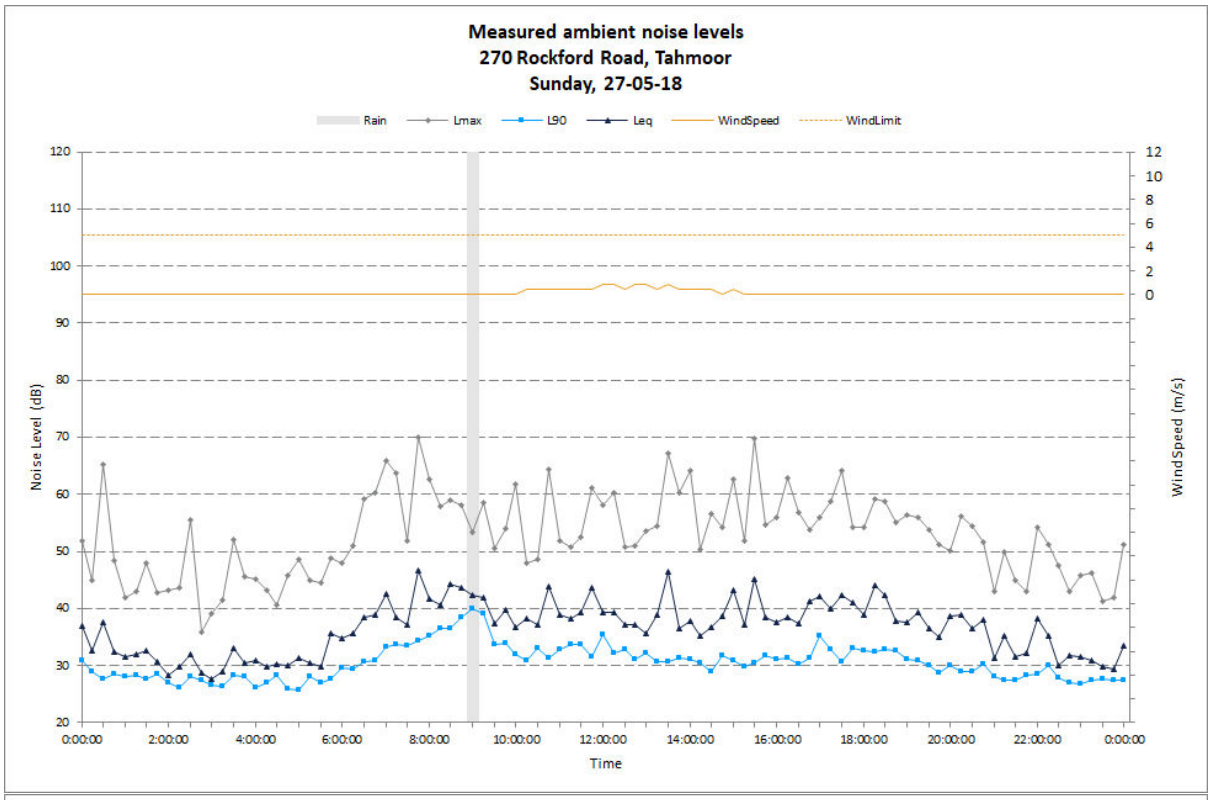

Measured ambient noise levels
270 Rockford Road, Tahmoor
Tuesday, 22-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

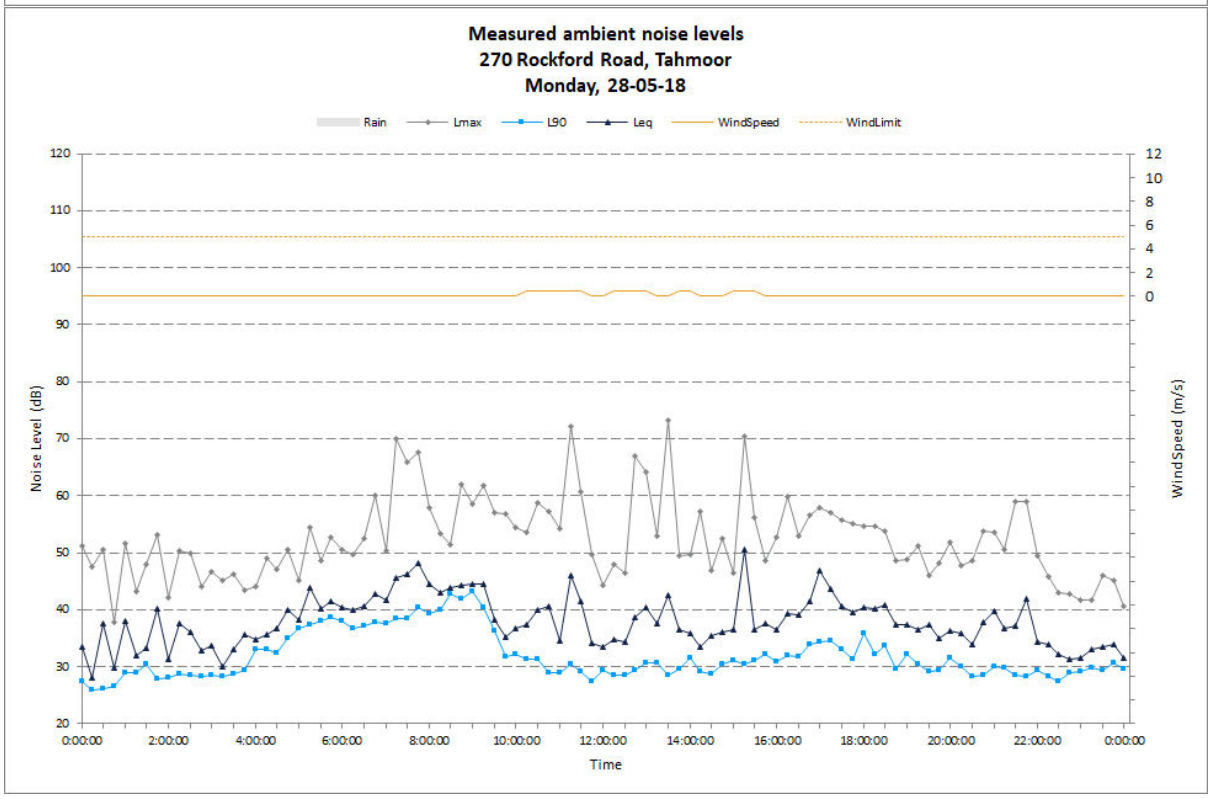

Measured ambient noise levels
270 Rockford Road, Tahmoor
Wednesday, 23-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
270 Rockford Road, Tahmoor
Thursday, 24-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
270 Rockford Road, Tahmoor
Friday, 25-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
270 Rockford Road, Tahmoor
Saturday, 26-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
270 Rockford Road, Tahmoor
Sunday, 27-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
270 Rockford Road, Tahmoor
Monday, 28-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

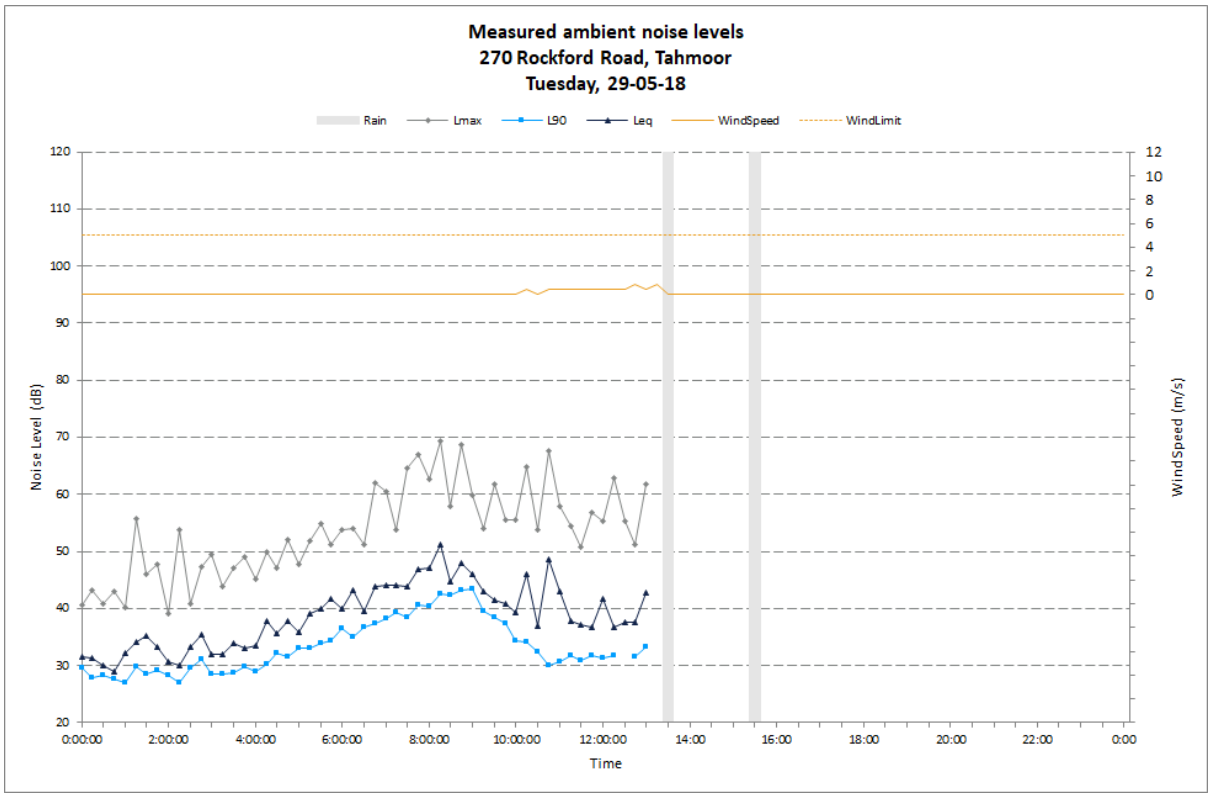
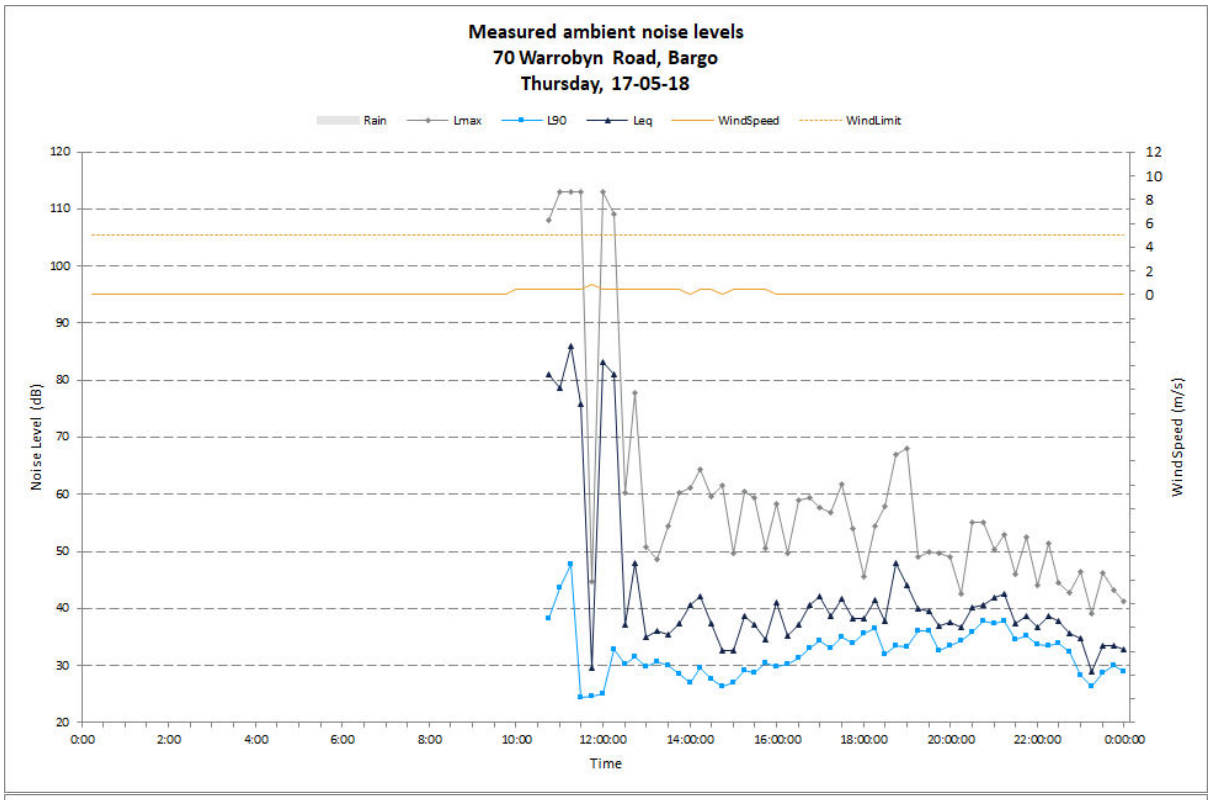
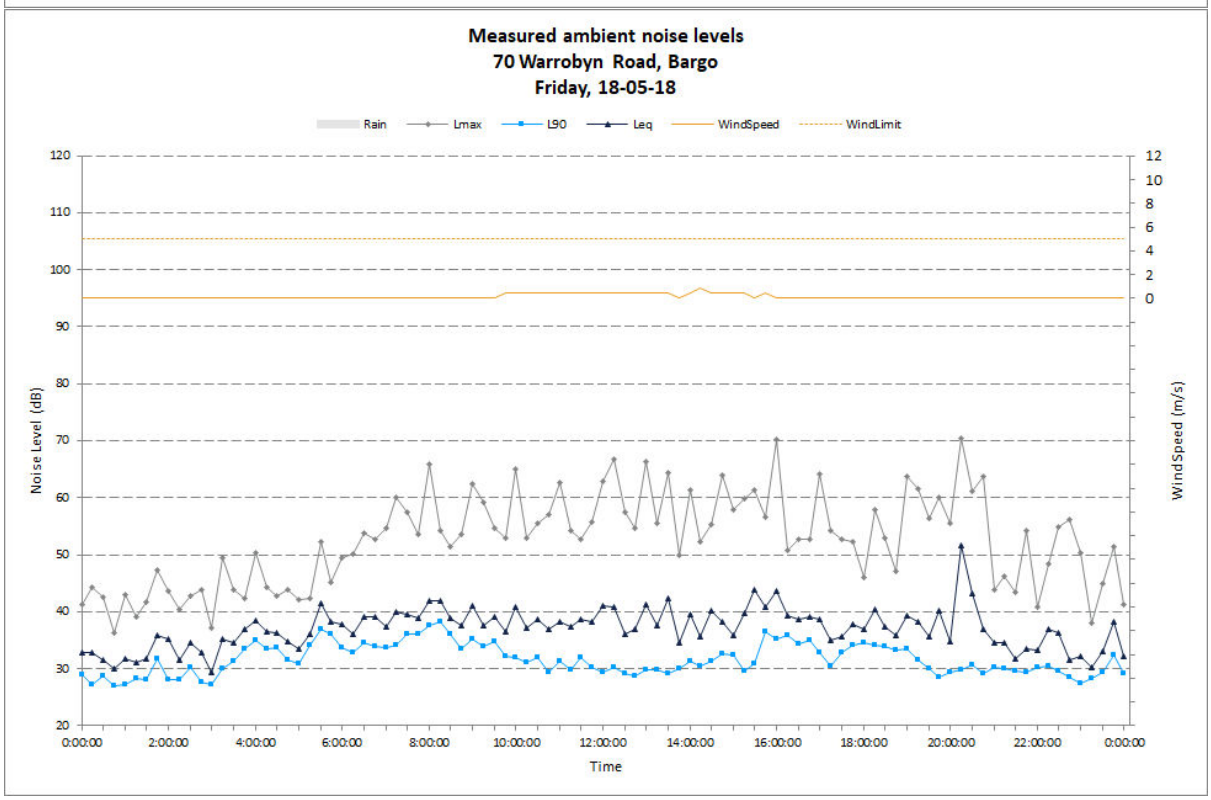

Measured ambient noise levels
270 Rockford Road, Tahmoor
Tuesday, 29-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
120
110
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00
16:00
18:00
20:00
22:00
0:00

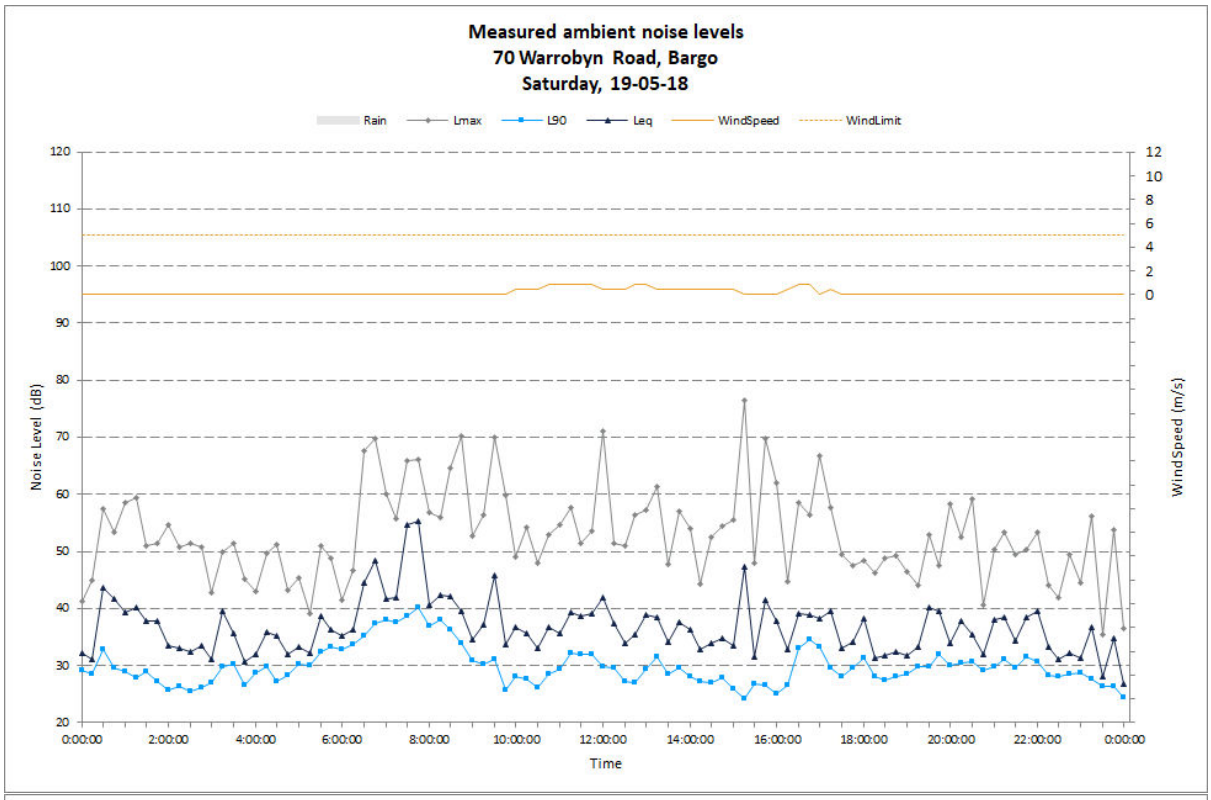
Table A.3 Summary of daily noise logging results –70 Warrobyn Road, Bargo

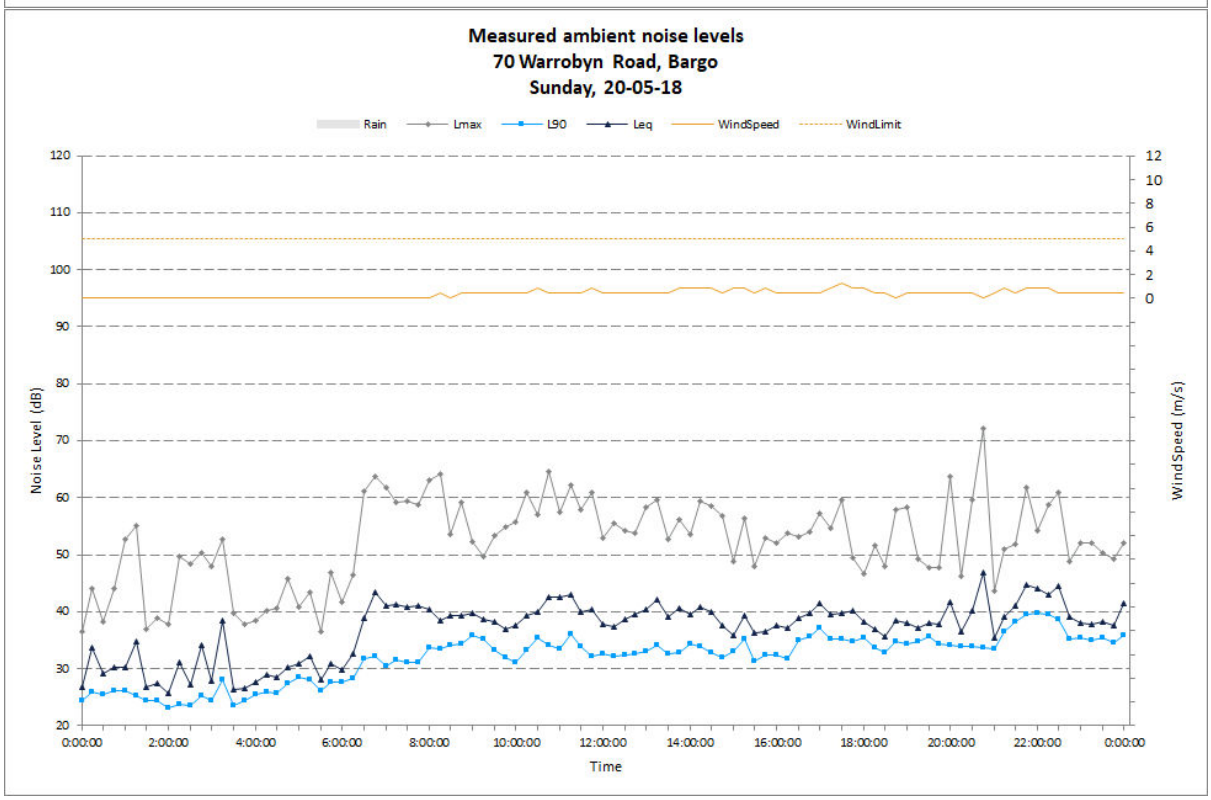
Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,11\ hour}$, dB (Day)	$L_{Aeq,4\ hour}$, dB (Evening)	$L_{Aeq,9\ hour}$, dB (Night)
Thursday, 17-05-18	0	33	27	0	41	36
Friday, 18-05-18	29	29	26	39	42	39
Saturday, 19-05-18	26	28	24	44	37	34
Sunday, 20-05-18	32	34	34	40	41	39
Monday, 21-05-18	36	32	31	47	41	40
Tuesday, 22-05-18	34	33	32	41	38	39
Wednesday, 23-05-18	26	29	28	39	38	39
Thursday, 24-05-18	27	30	29	39	35	37
Friday, 25-05-18	27	33	26	39	39	35
Saturday, 26-05-18	29	28	30	39	37	37
Sunday, 27-05-18	28	31	28	40	37	39
Monday, 28-05-18	27	29	31	40	36	42
Tuesday, 29-05-18	0	0	0	0	0	0
Overall	**28**	**31**	**29**	**42**	**39**	**38**

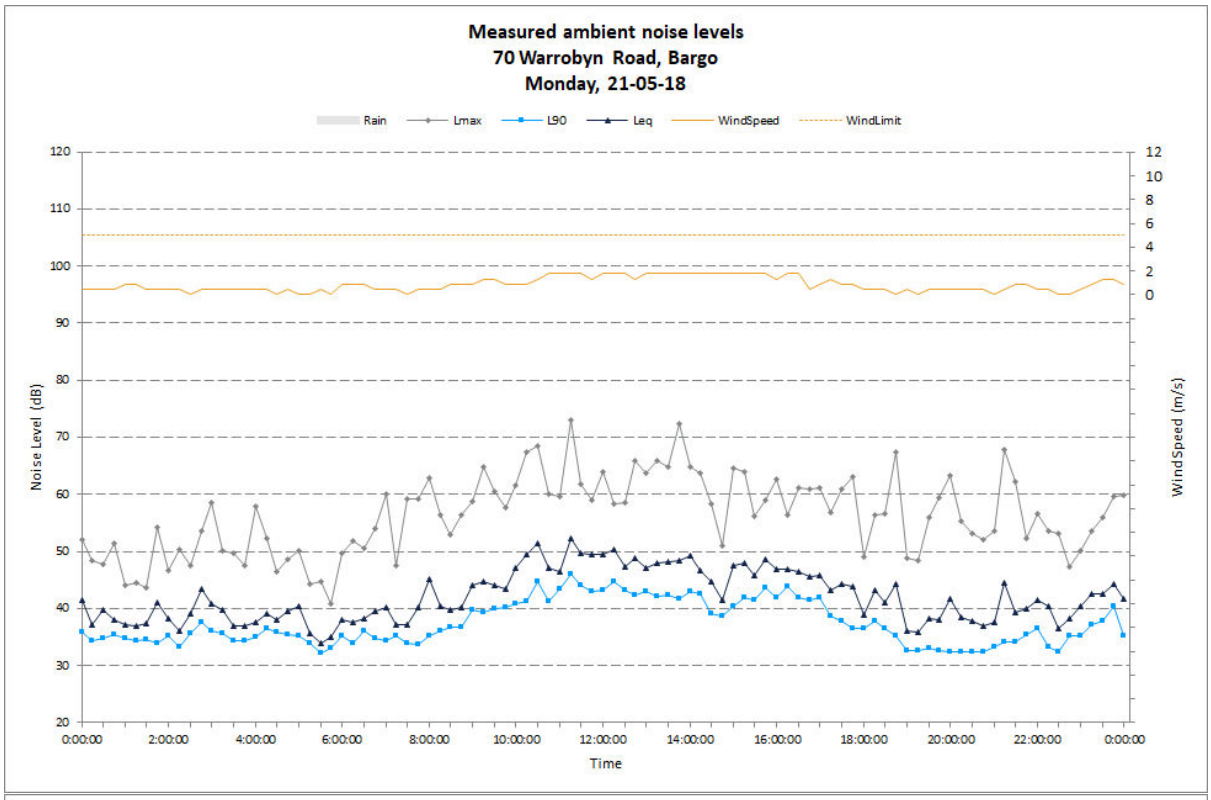
Notes: "0" indicates periods with too few valid samples due to weather or logger operation

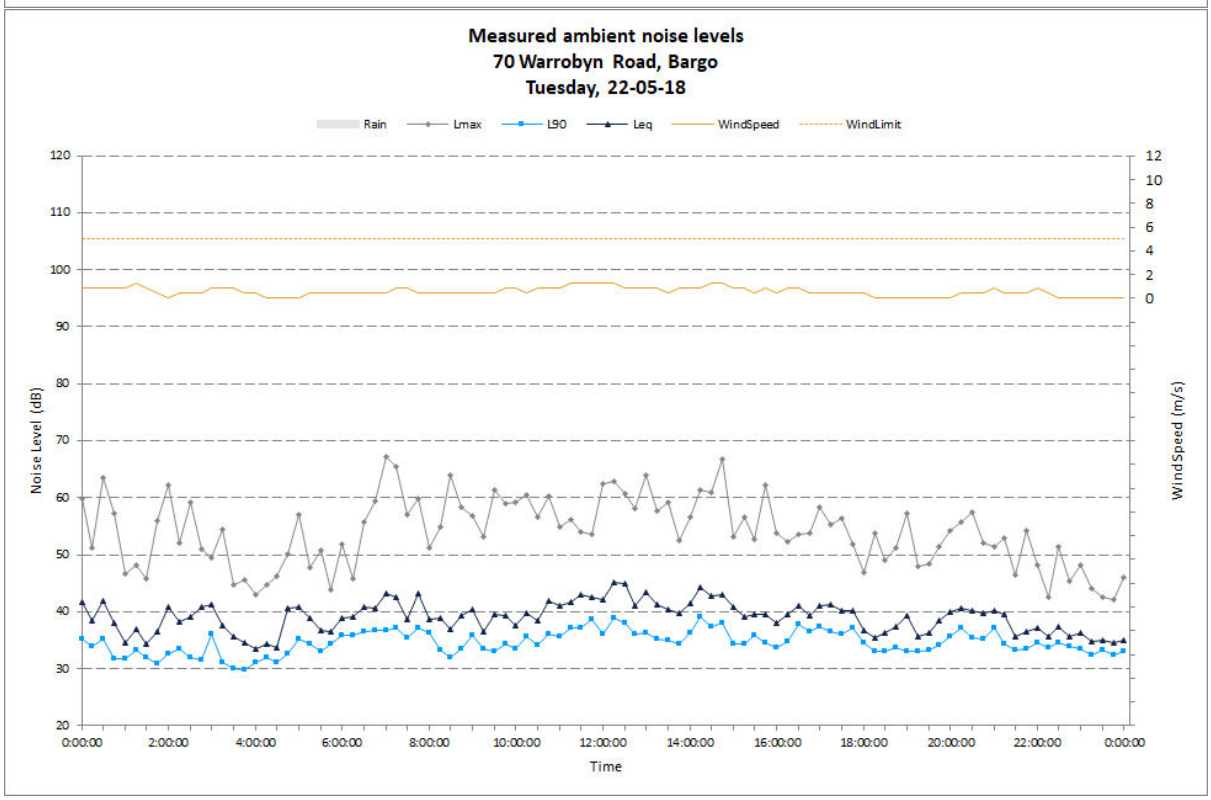

Measured ambient noise levels
70 Warrobyn Road, Bargo
Thursday, 17-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

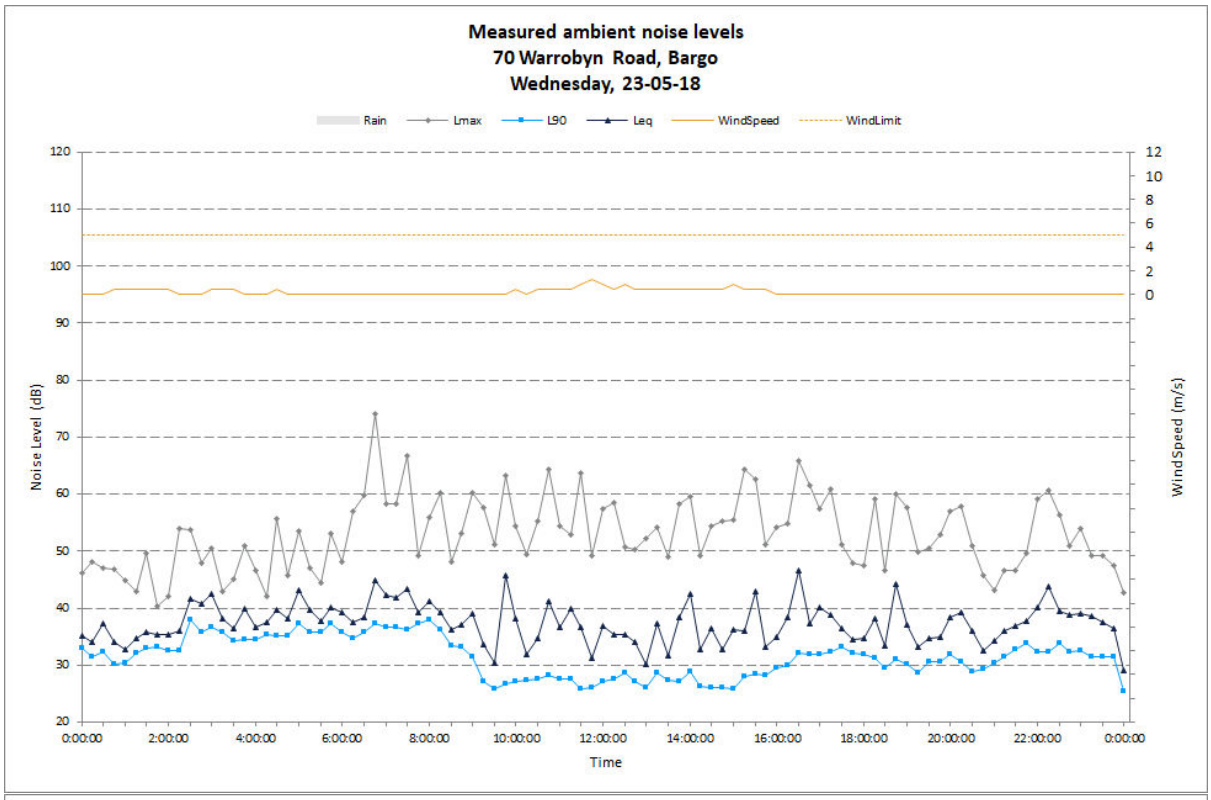

Measured ambient noise levels
70 Warrobyn Road, Bargo
Friday, 18-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

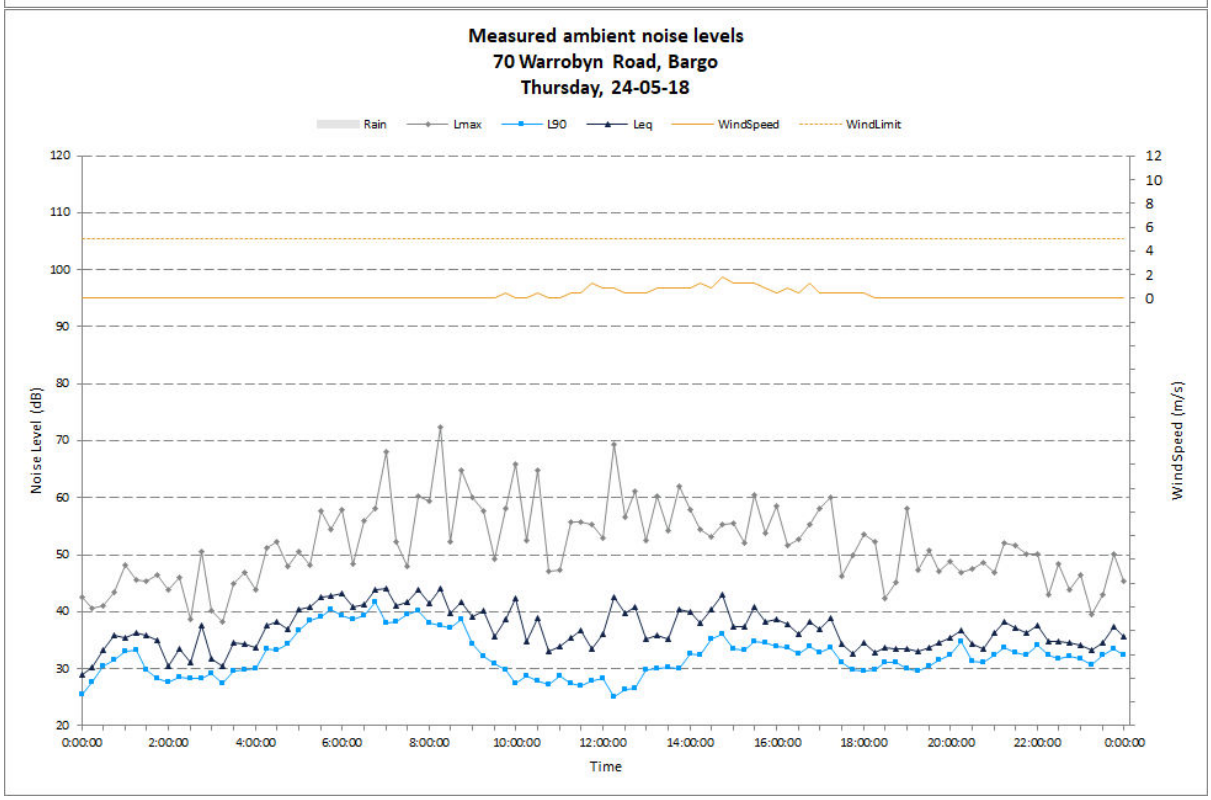

Measured ambient noise levels
70 Warrobyn Road, Bargo
Saturday, 19-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

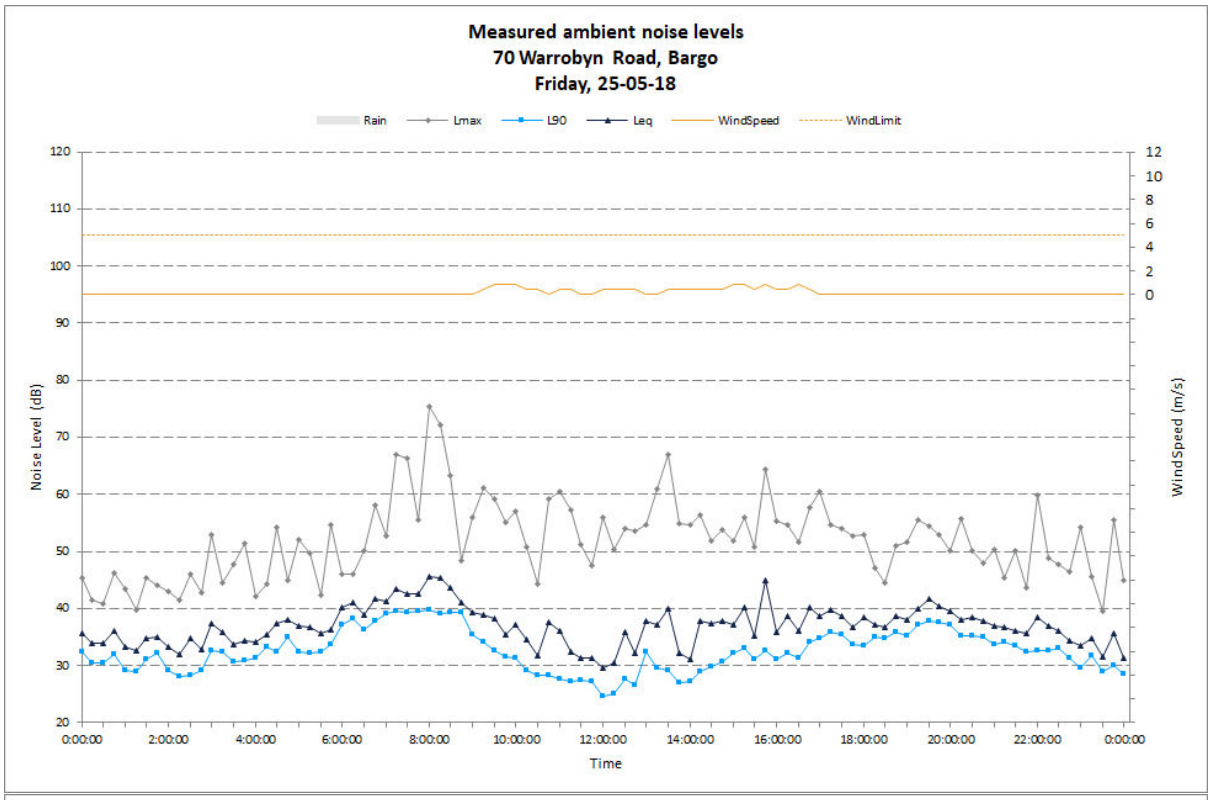

Measured ambient noise levels
70 Warrobyn Road, Bargo
Sunday, 20-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

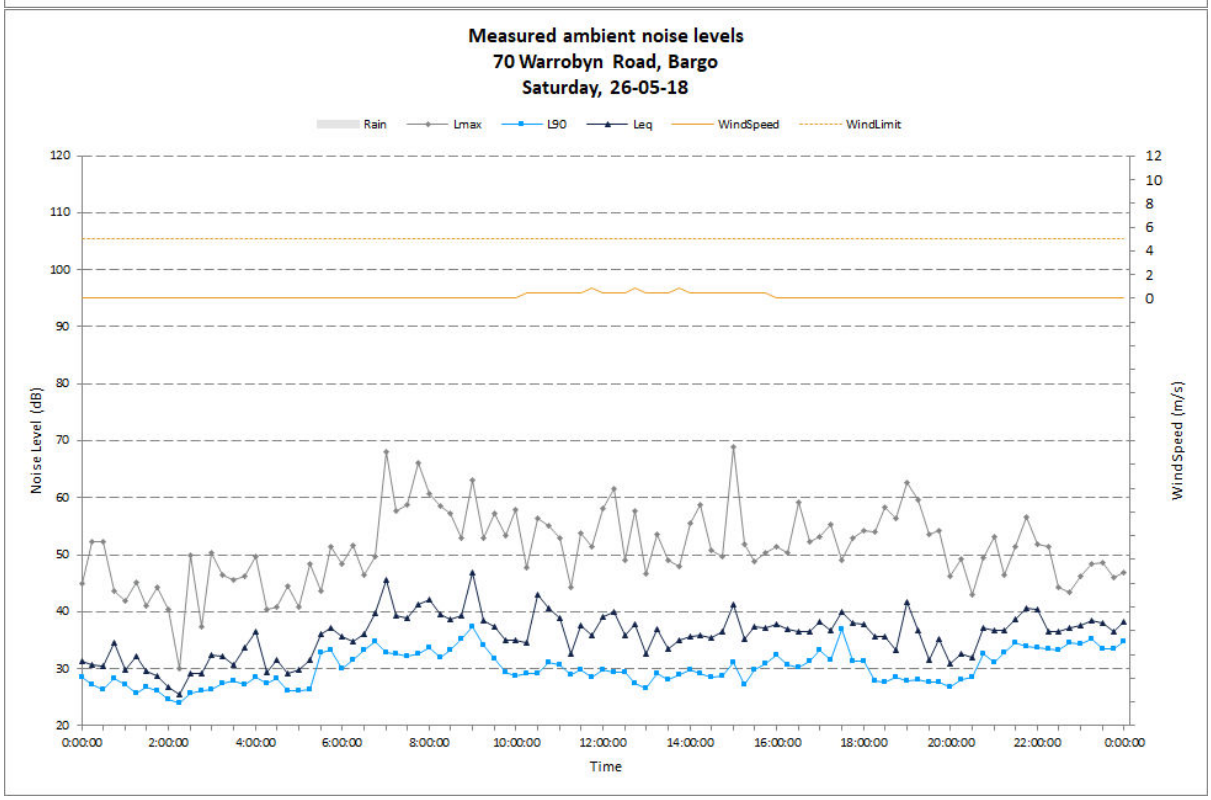

Measured ambient noise levels
70 Warrobyn Road, Bargo
Monday, 21-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

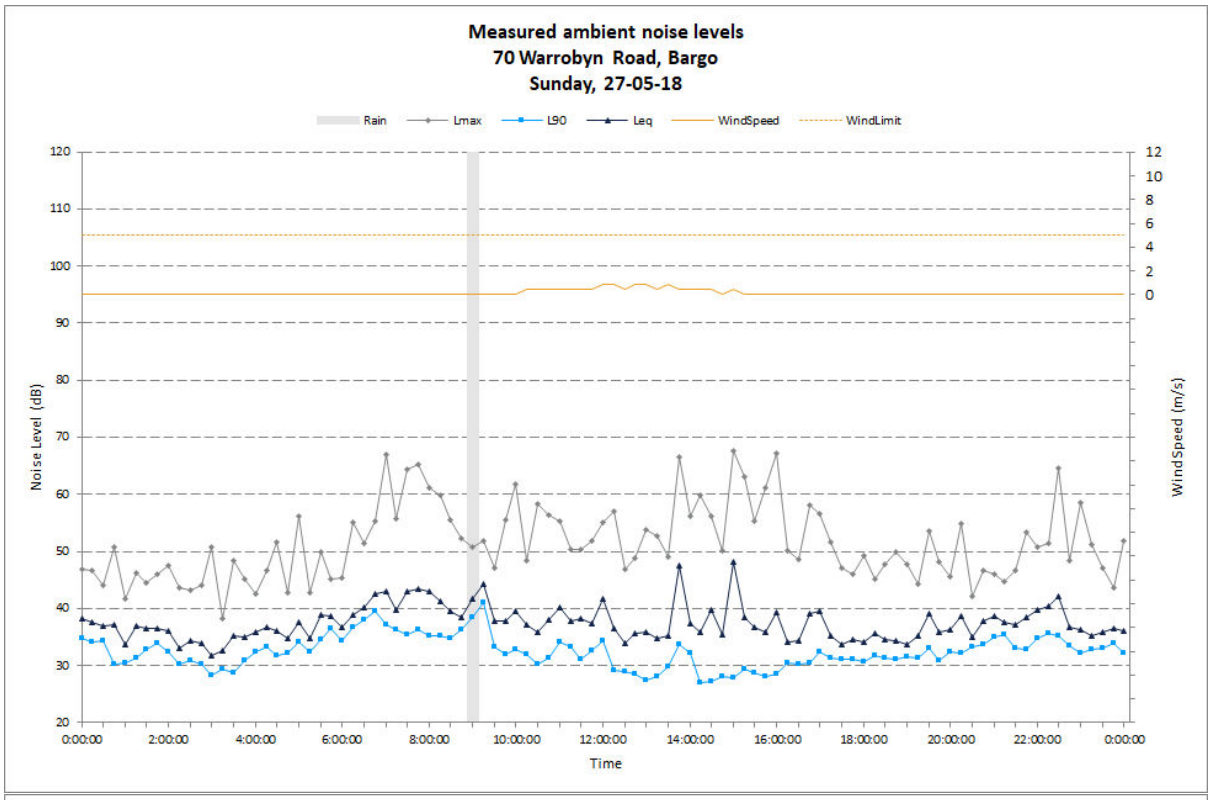

Measured ambient noise levels
70 Warrobyn Road, Bargo
Tuesday, 22-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

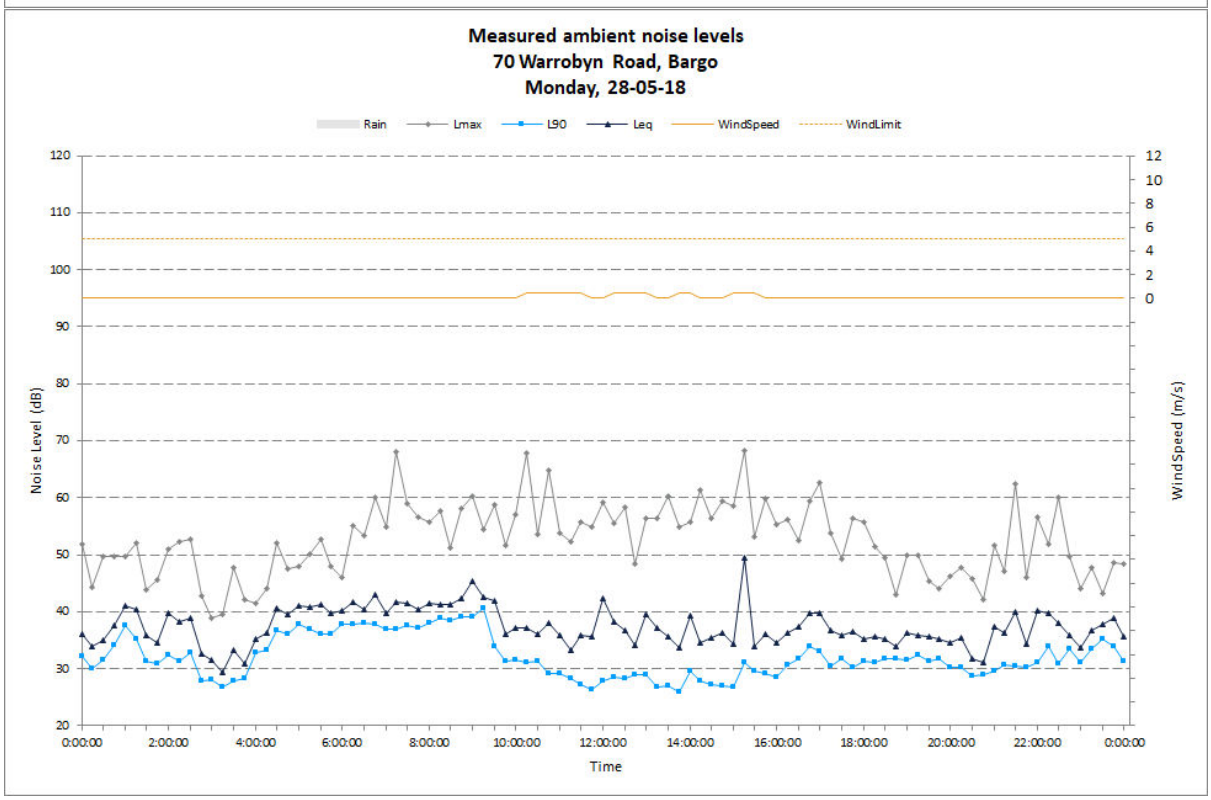

Measured ambient noise levels
70 Warrobyn Road, Bargo
Wednesday, 23-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
70 Warrobyn Road, Bargo
Thursday, 24-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
70 Warrobyn Road, Bargo
Friday, 25-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
70 Warrobyn Road, Bargo
Saturday, 26-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
70 Warrobyn Road, Bargo
Sunday, 27-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00


Measured ambient noise levels
70 Warrobyn Road, Bargo
Monday, 28-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00
18:00:00
20:00:00
22:00:00
0:00:00

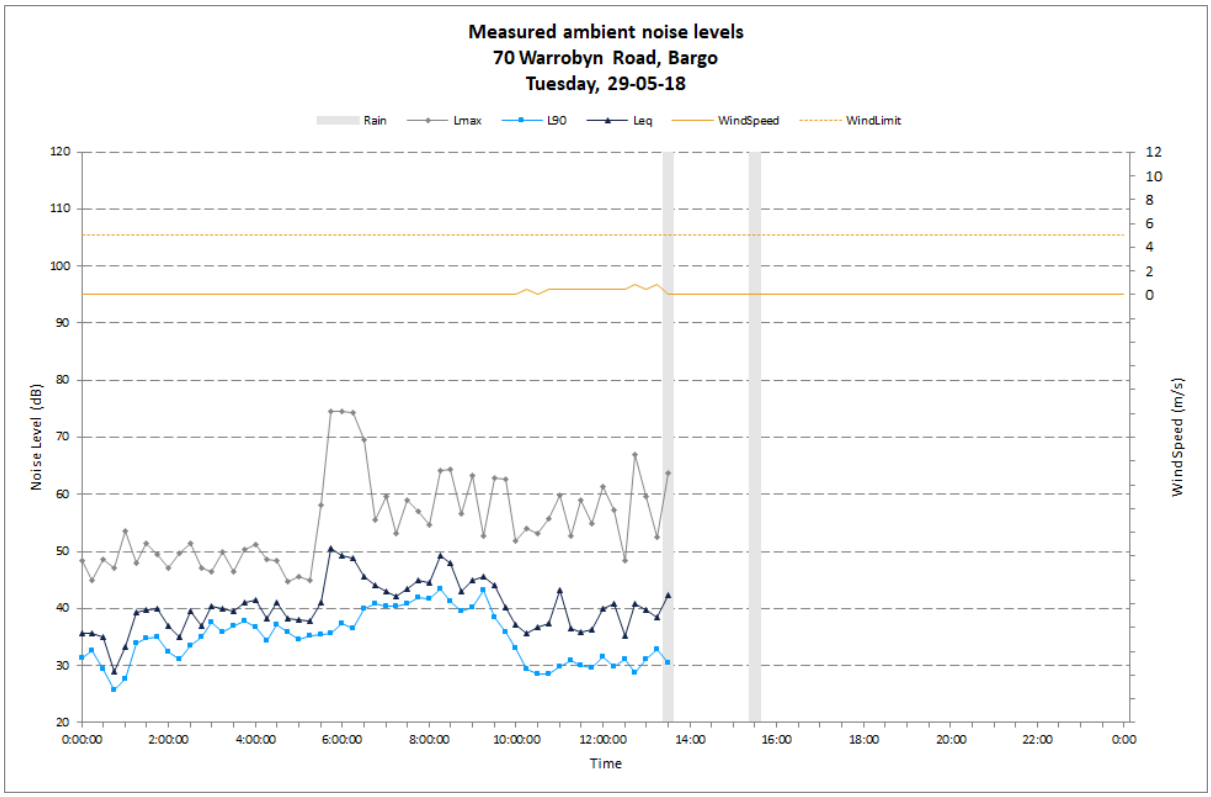
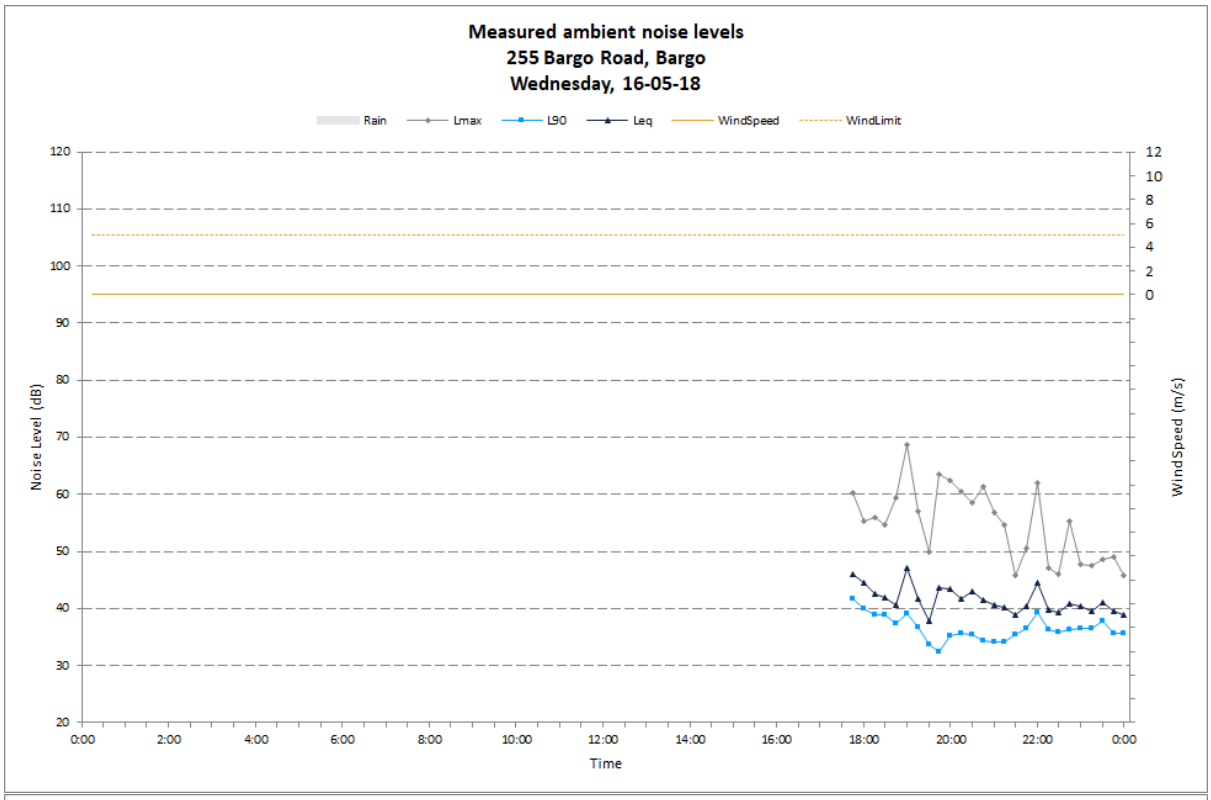
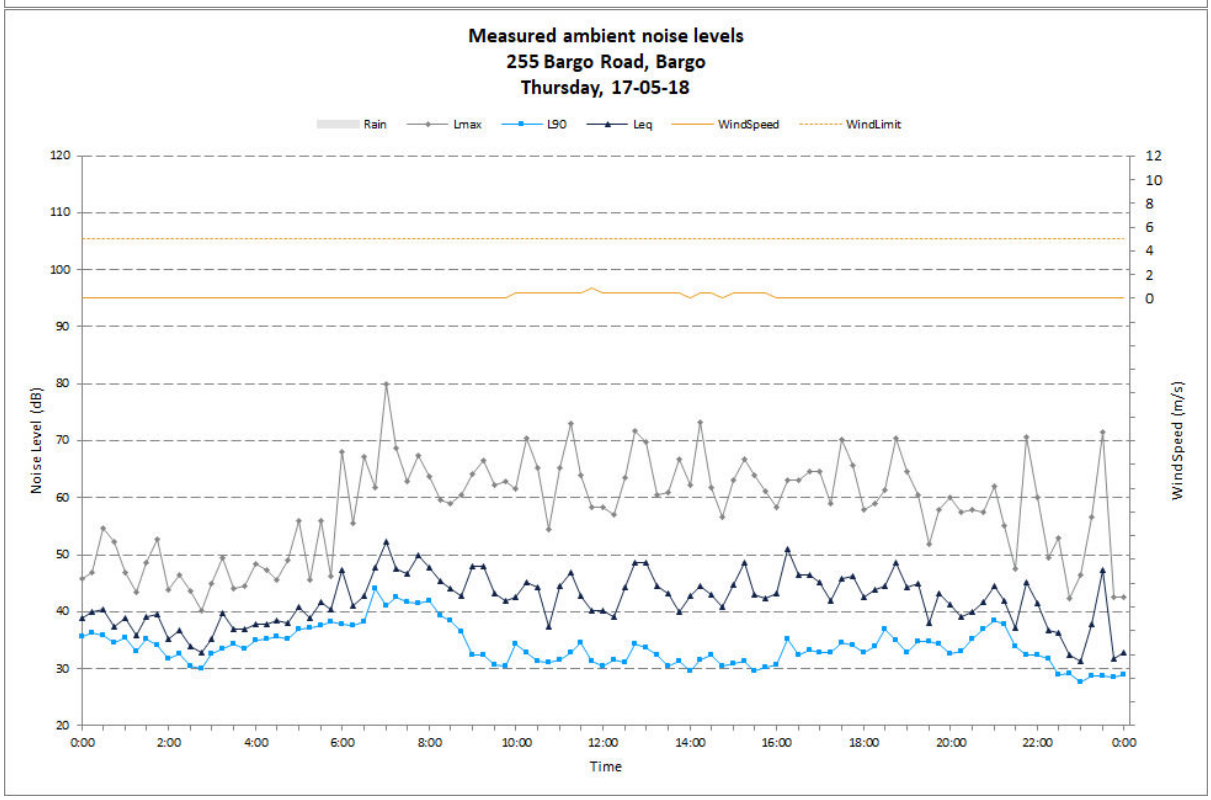

Measured ambient noise levels
70 Warrobyn Road, Bargo
Tuesday, 29-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
120
110
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00
16:00
18:00
20:00
22:00
0:00

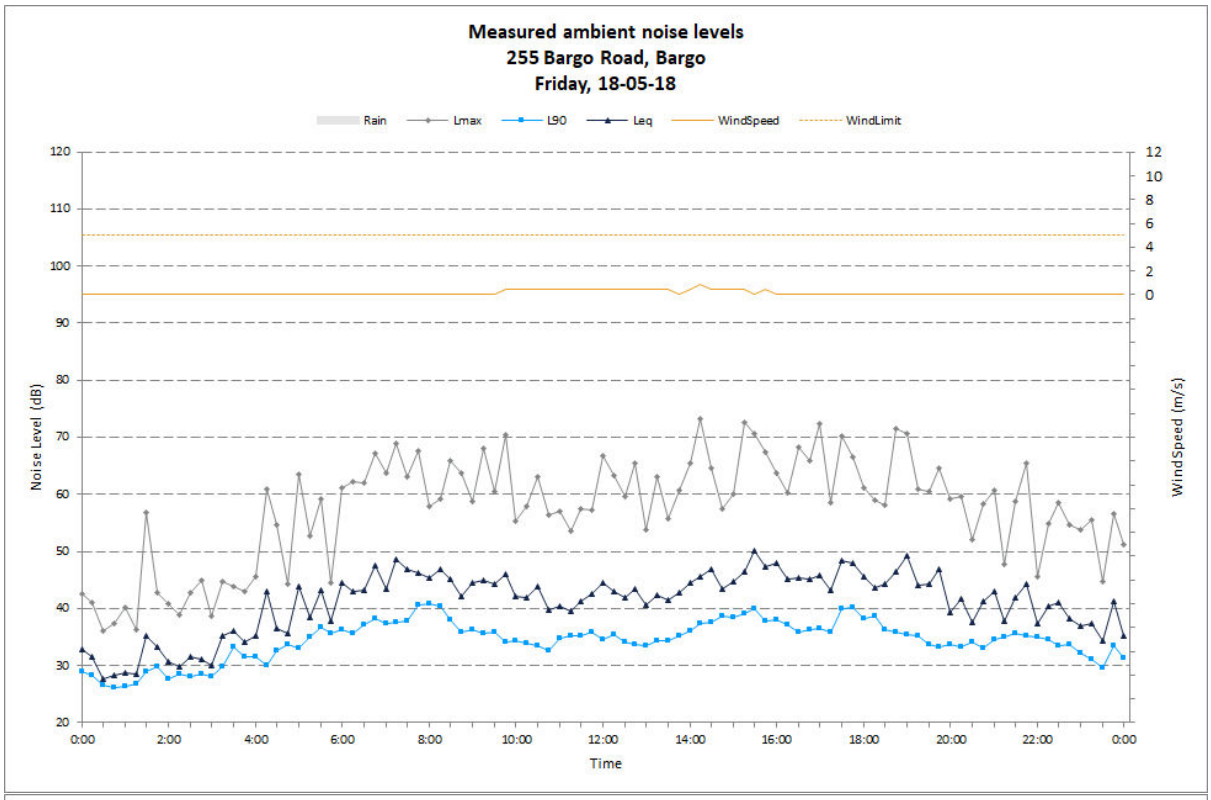
Table A.4 Summary of daily noise logging results –255 Bargo Road, Bargo

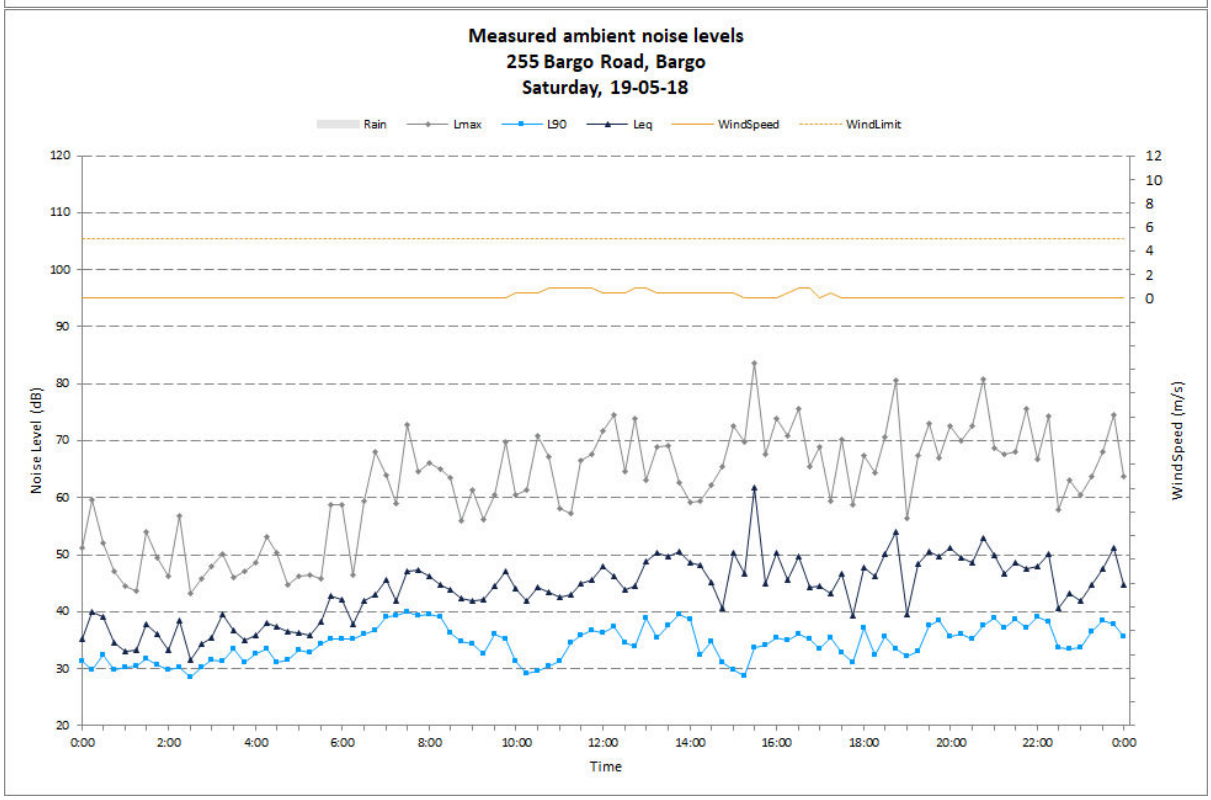
Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,11\ hour}$, dB (Day)	$L_{Aeq,4\ hour}$, dB (Evening)	$L_{Aeq,9\ hour}$, dB (Night)
Wednesday, 16-05-18	0	34	33	0	42	42
Thursday, 17-05-18	30	33	27	45	43	40
Friday, 18-05-18	34	33	30	45	44	39
Saturday, 19-05-18	30	33	29	49	50	42
Sunday, 20-05-18	33	35	33	46	45	42
Monday, 21-05-18	39	36	33	54	47	42
Tuesday, 22-05-18	37	35	31	48	44	41
Wednesday, 23-05-18	29	33	30	45	45	43
Thursday, 24-05-18	33	35	34	46	42	43
Friday, 25-05-18	33	38	29	56	46	39
Saturday, 26-05-18	33	29	29	47	41	39
Sunday, 27-05-18	32	31	0	55	43	0
Monday, 28-05-18	0	0	0	0	0	0
Overall	**33**	**34**	**30**	**51**	**45**	**41**

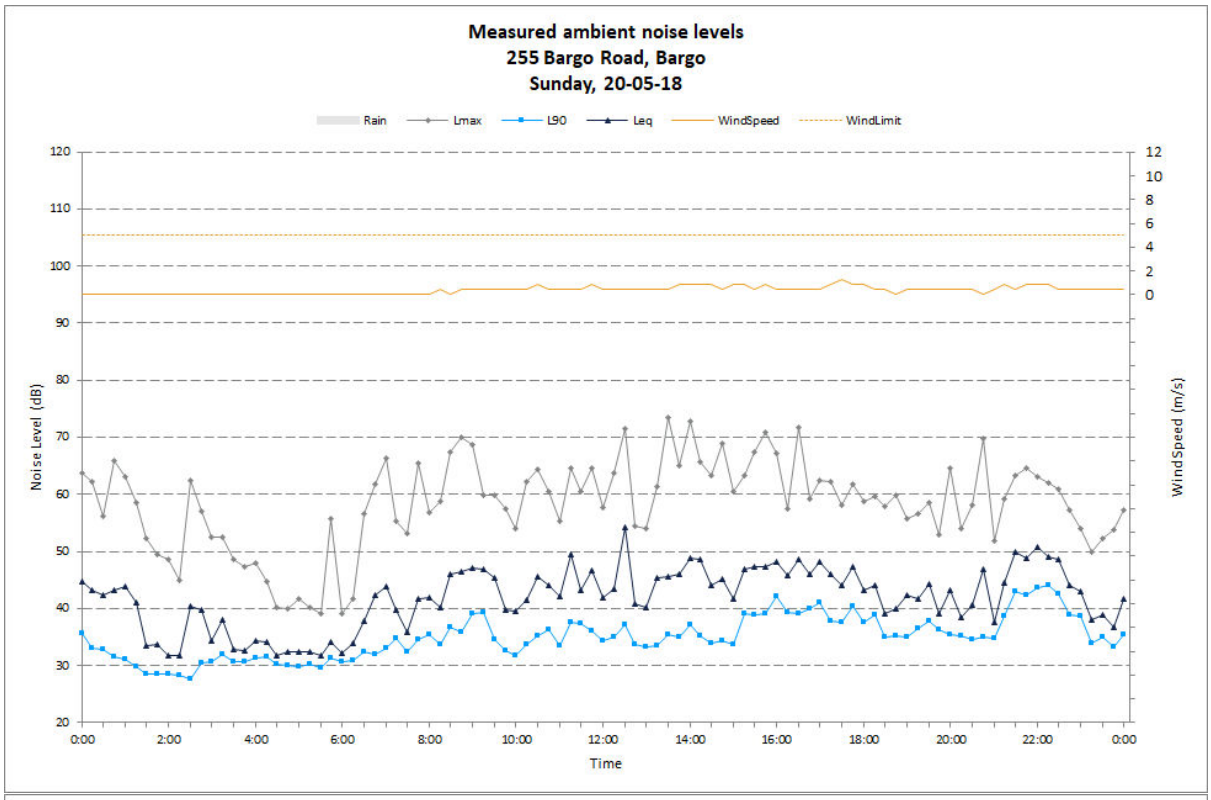
Notes: "0" indicates periods with too few valid samples due to weather or logger operation

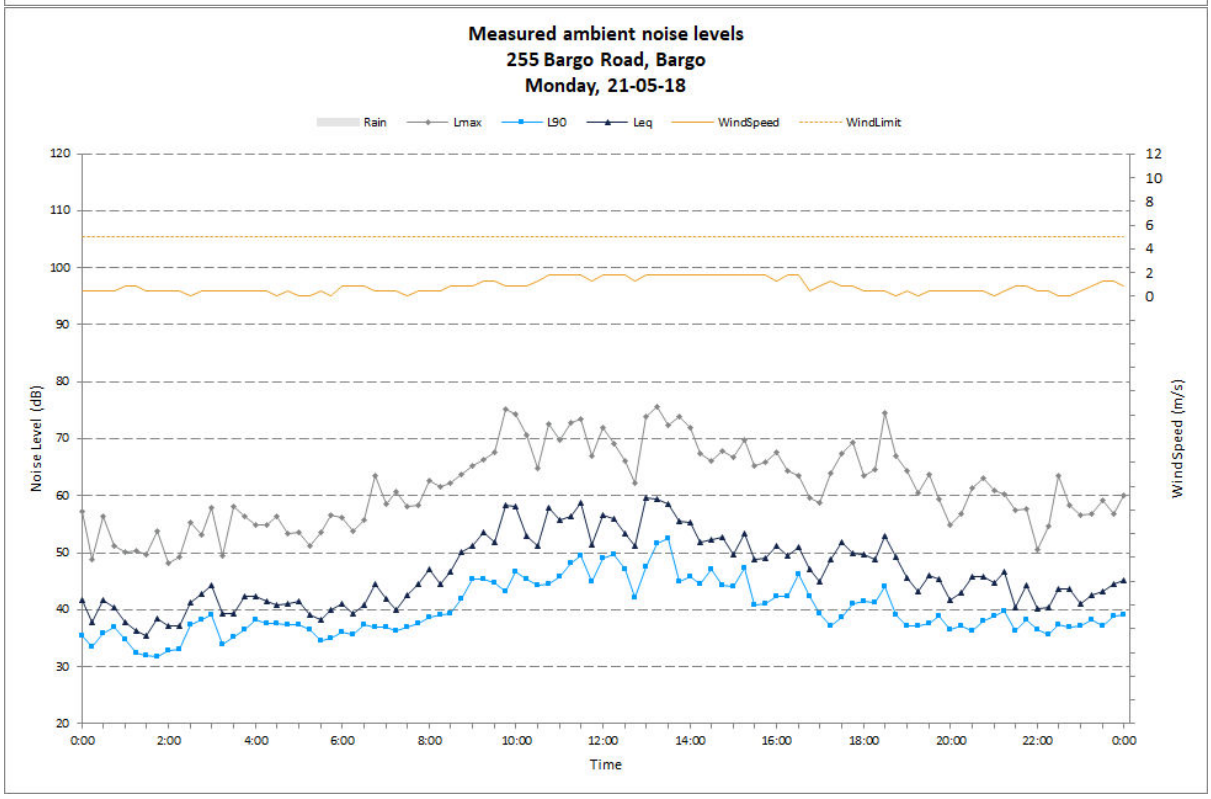

Measured ambient noise levels
255 Bargo Road, Bargo
Wednesday, 16-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

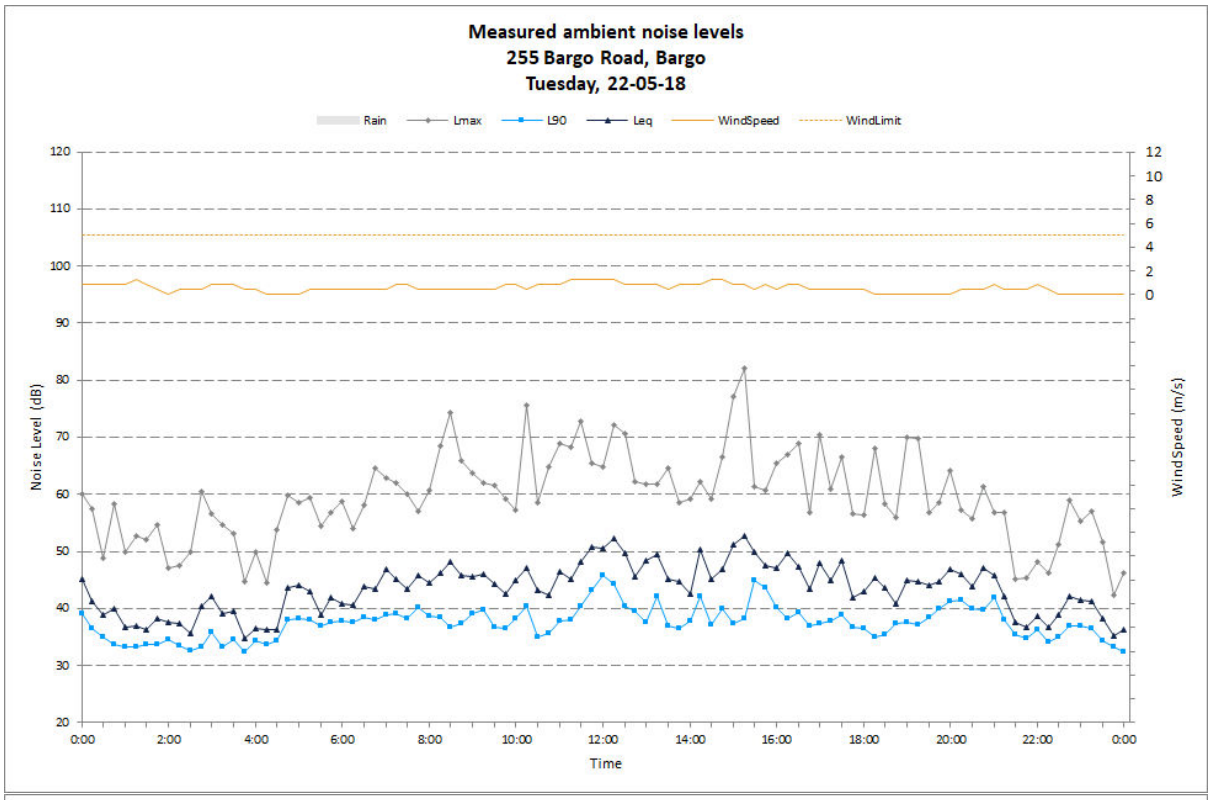

Measured ambient noise levels
255 Bargo Road, Bargo
Thursday, 17-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

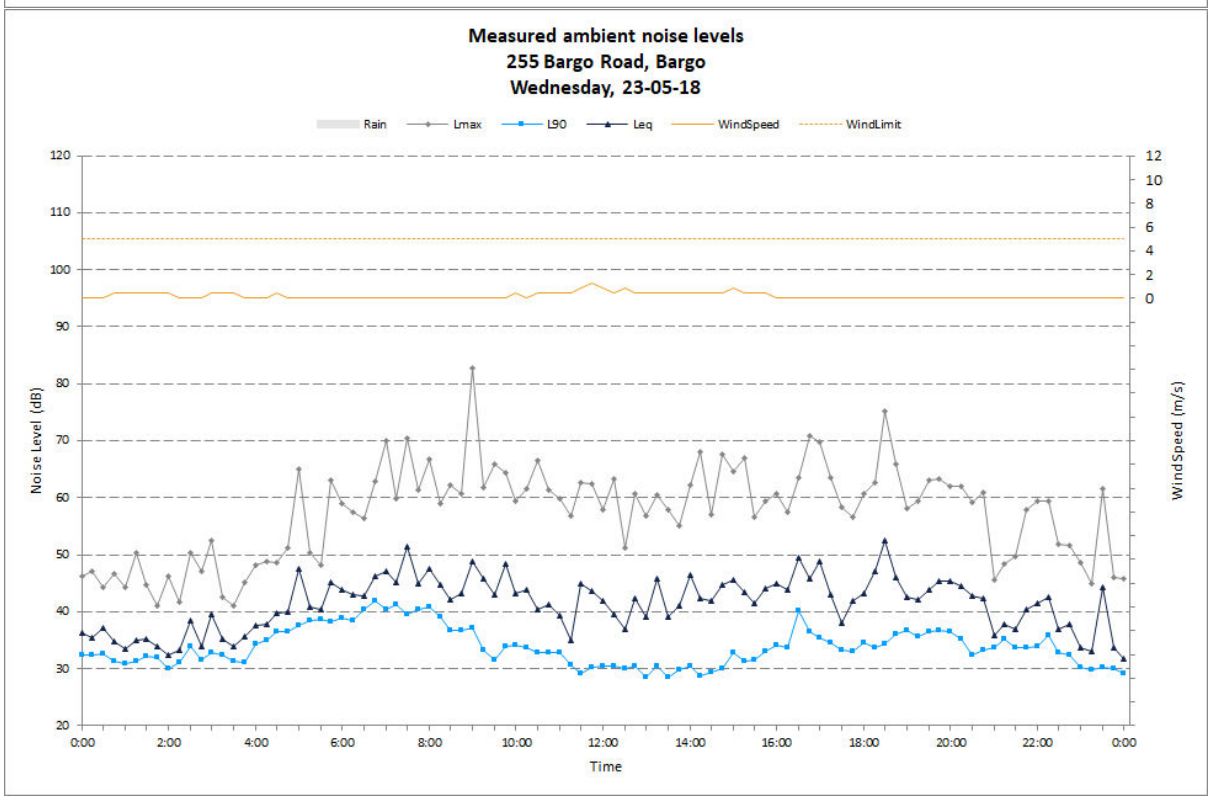

Measured ambient noise levels
255 Bargo Road, Bargo
Friday, 18-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

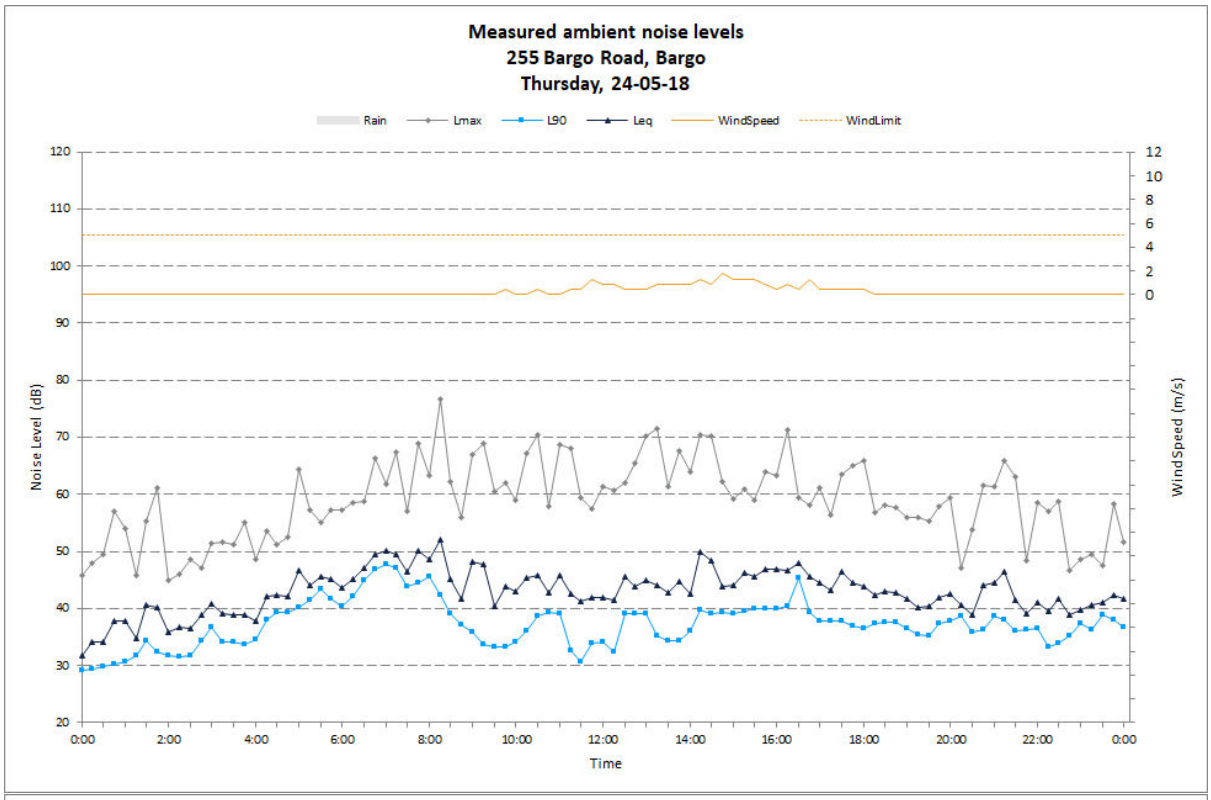

Measured ambient noise levels
255 Bargo Road, Bargo
Saturday, 19-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

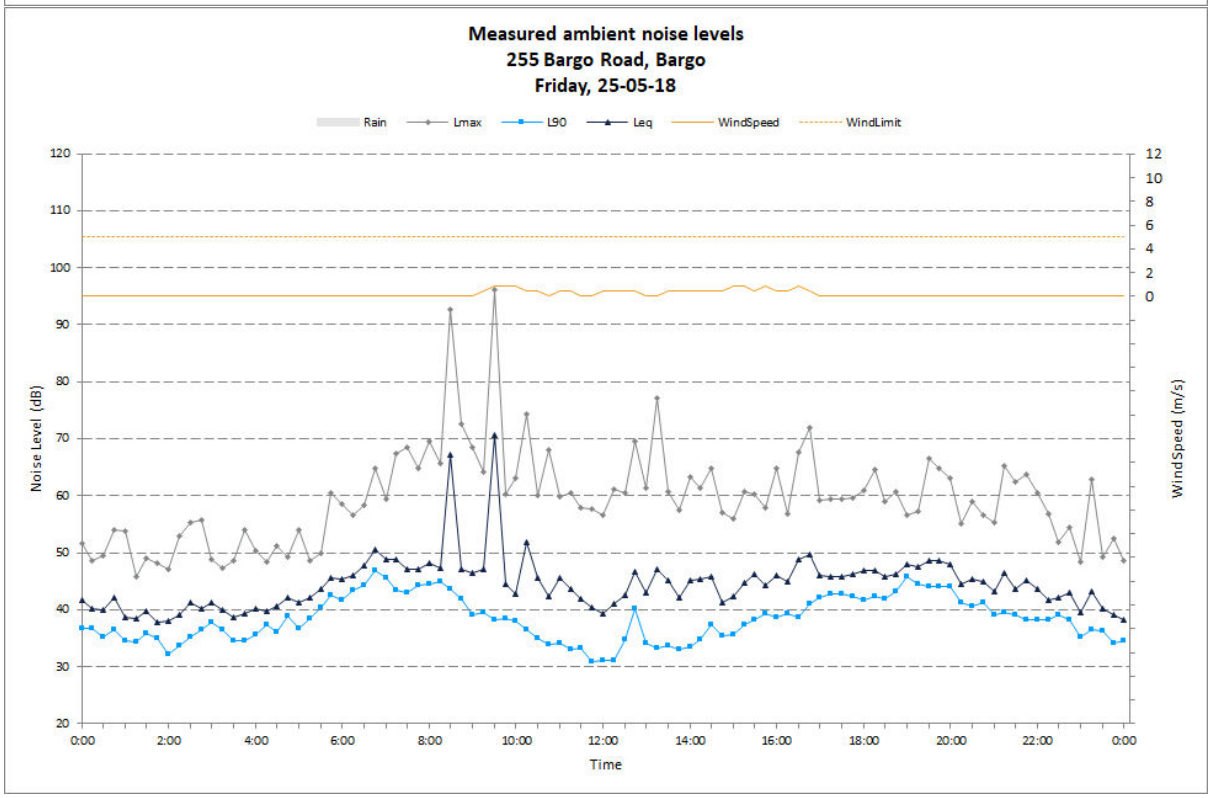

Measured ambient noise levels
255 Bargo Road, Bargo
Sunday, 20-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

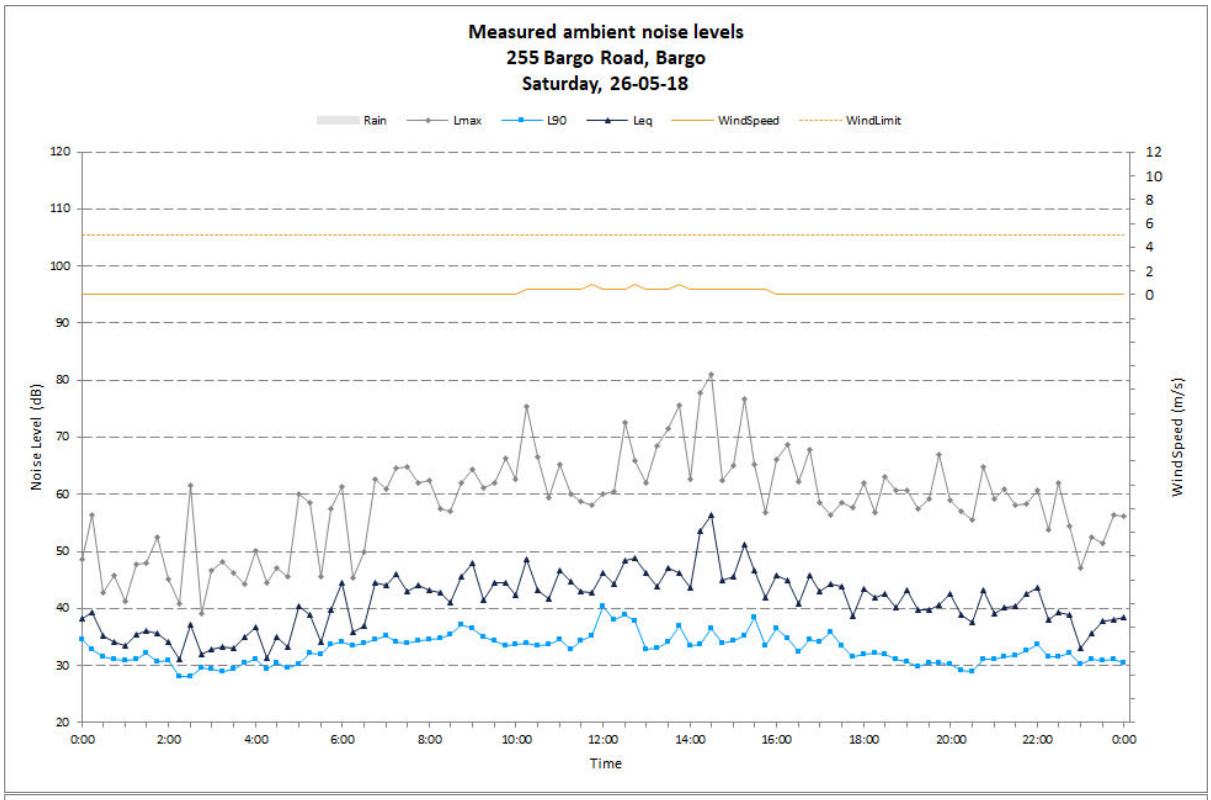

Measured ambient noise levels
255 Bargo Road, Bargo
Monday, 21-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

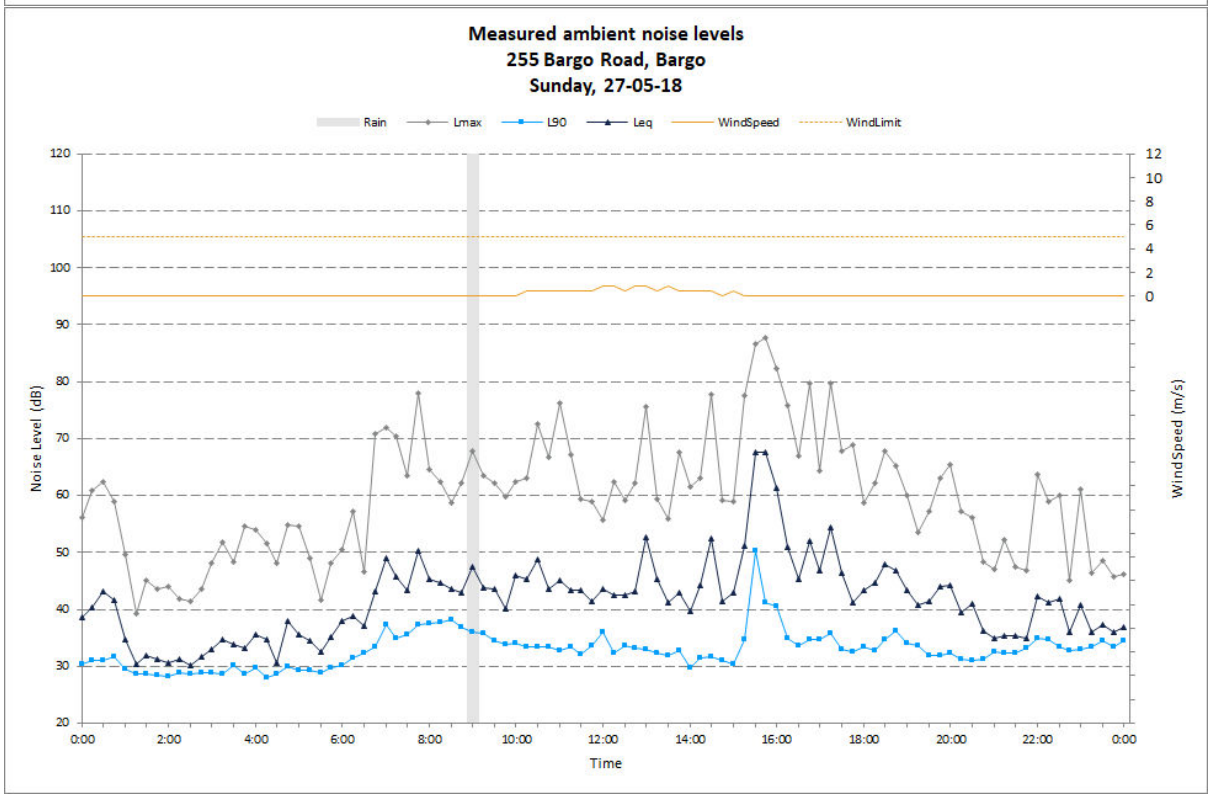

Measured ambient noise levels
255 Bargo Road, Bargo
Tuesday, 22-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
255 Bargo Road, Bargo
Wednesday, 23-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
255 Bargo Road, Bargo
Thursday, 24-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
255 Bargo Road, Bargo
Friday, 25-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
255 Bargo Road, Bargo
Saturday, 26-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
255 Bargo Road, Bargo
Sunday, 27-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

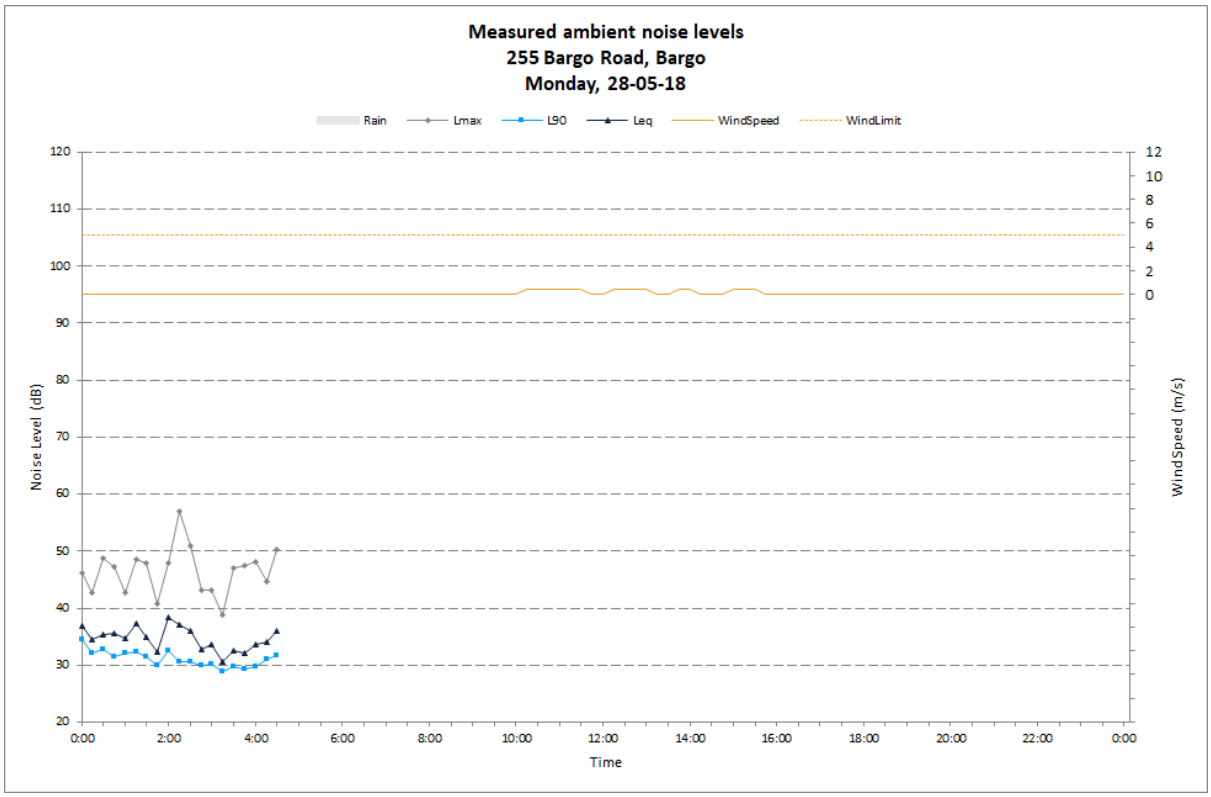
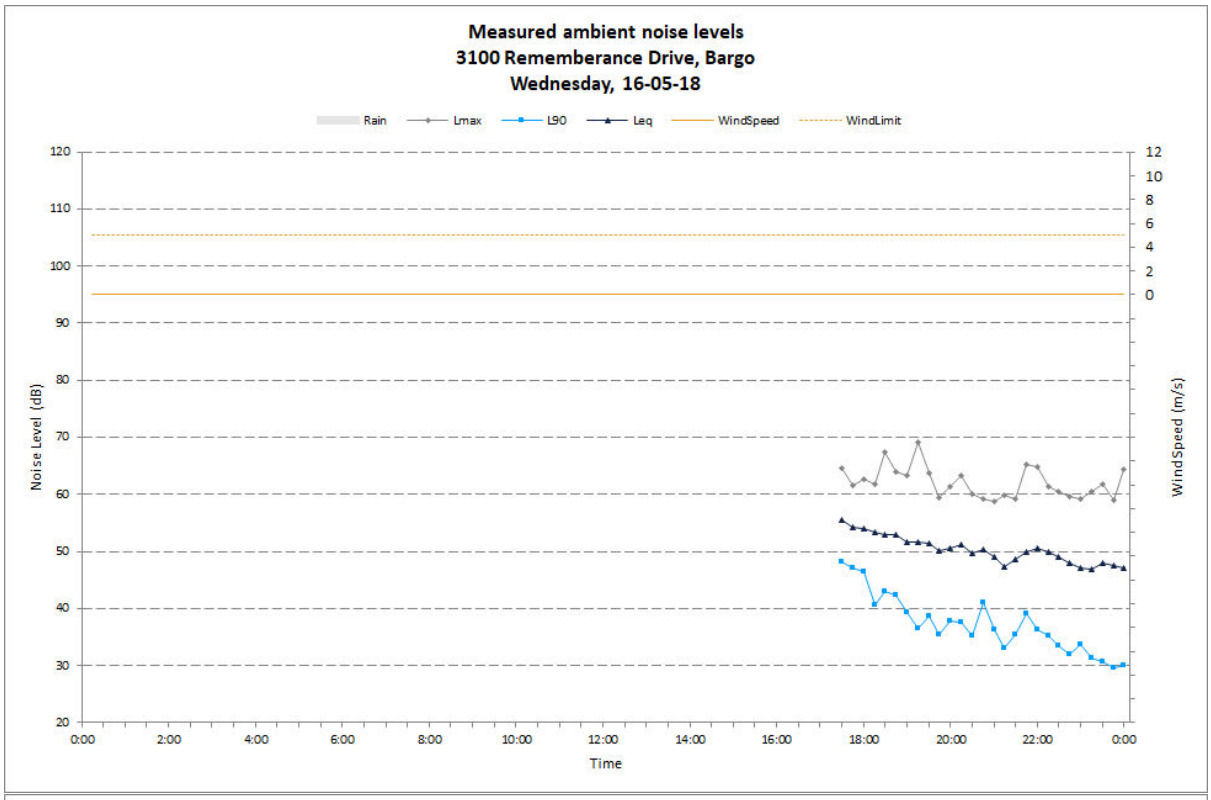
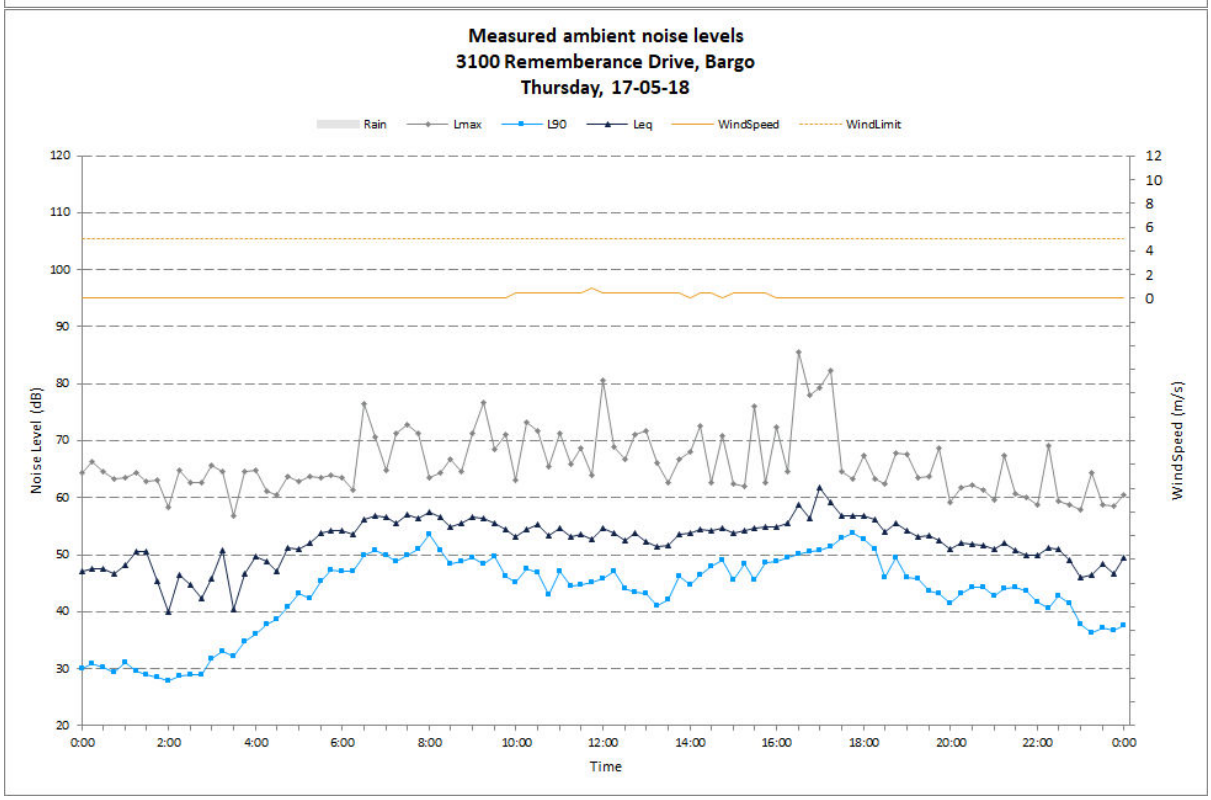

Measured ambient noise levels
255 Bargo Road, Bargo
Monday, 28-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
120
110
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

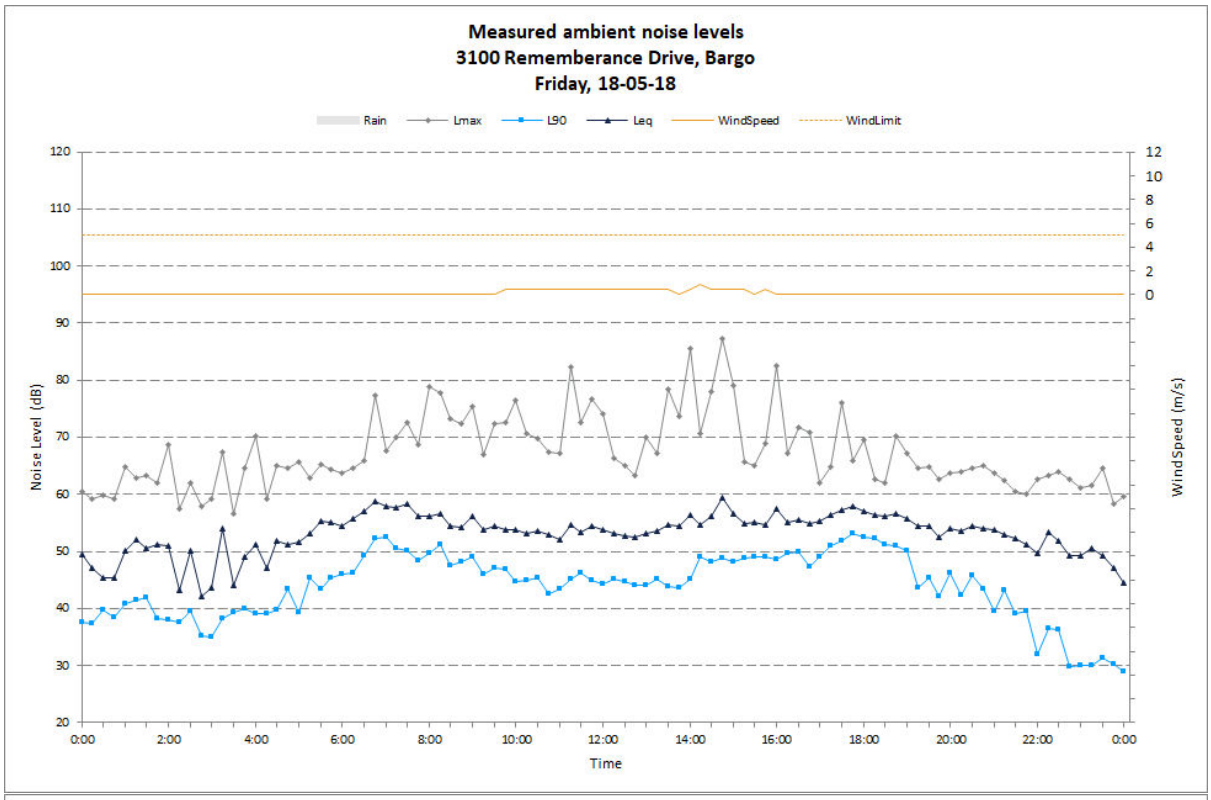
Table A.5 Summary of daily noise logging results –3100 Rememberance Drive, Bargo

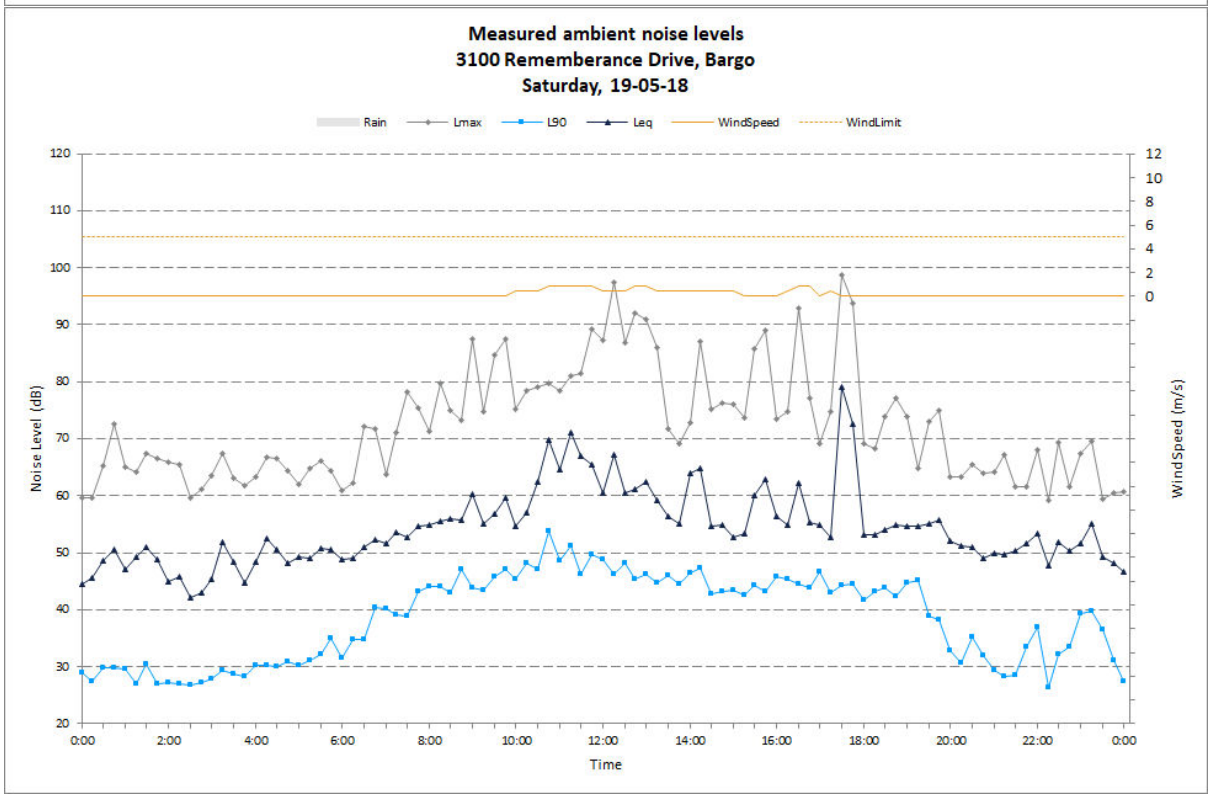
Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,11\ hour}$, dB (Day)	$L_{Aeq,4\ hour}$, dB (Evening)	$L_{Aeq,9\ hour}$, dB (Night)
Wednesday, 16-05-18	0	35	29	0	51	51
Thursday, 17-05-18	44	42	37	56	53	52
Friday, 18-05-18	44	39	27	55	54	50
Saturday, 19-05-18	43	28	25	66	53	48
Sunday, 20-05-18	39	36	32	54	50	49
Monday, 21-05-18	48	37	31	57	50	49
Tuesday, 22-05-18	45	35	27	55	53	51
Wednesday, 23-05-18	44	41	30	57	53	52
Thursday, 24-05-18	43	34	28	56	51	50
Friday, 25-05-18	45	38	28	57	53	48
Saturday, 26-05-18	45	39	33	58	53	48
Sunday, 27-05-18	42	37	31	60	53	50
Monday, 28-05-18	44	41	38	57	52	51
Tuesday, 29-05-18	0	0	0	0	0	0
Overall	**44**	**37**	**30**	**59**	**52**	**50**

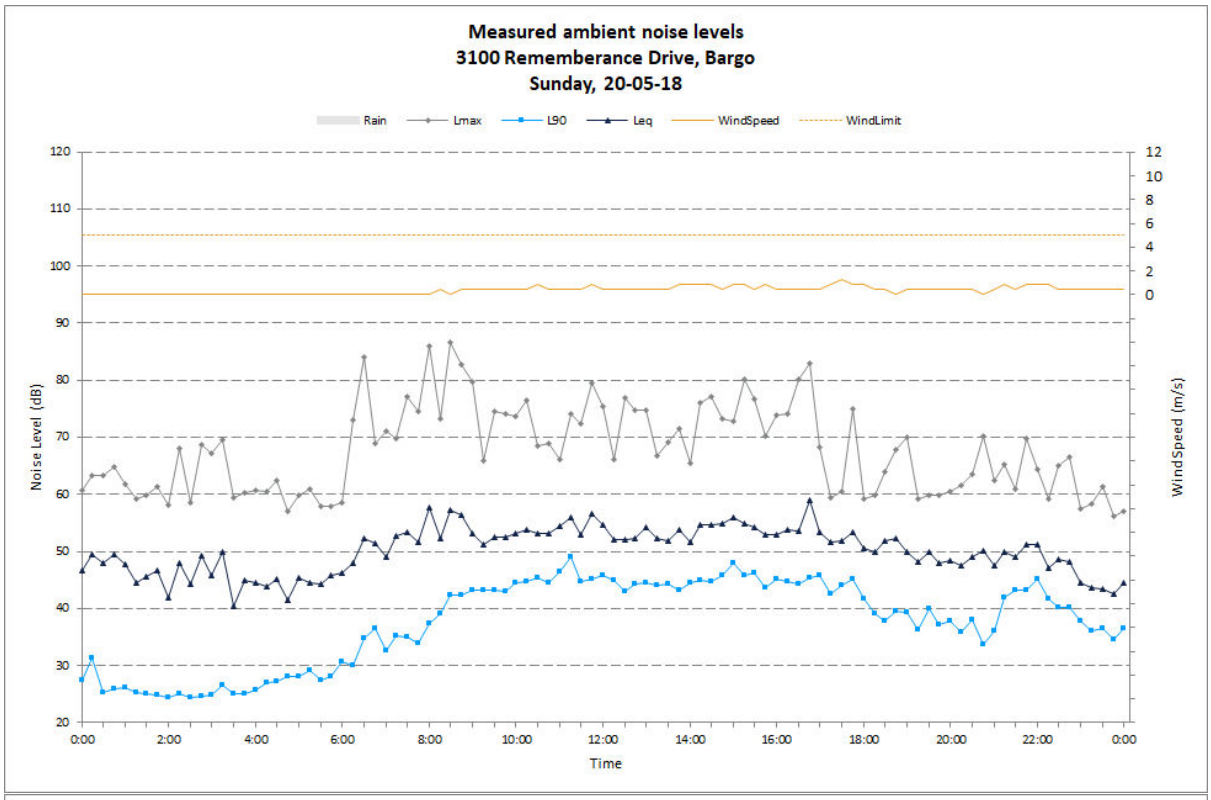
Notes: "0" indicates periods with too few valid samples due to weather or logger operation

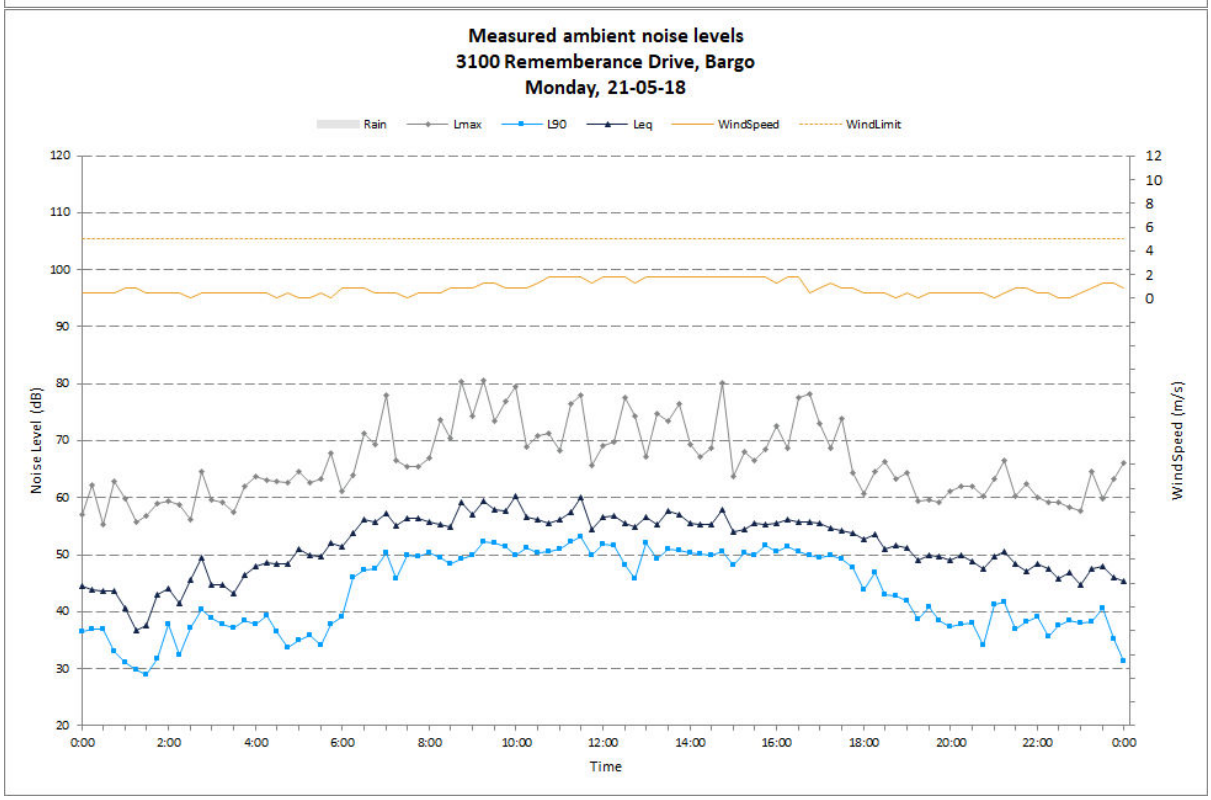

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Wednesday, 16-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

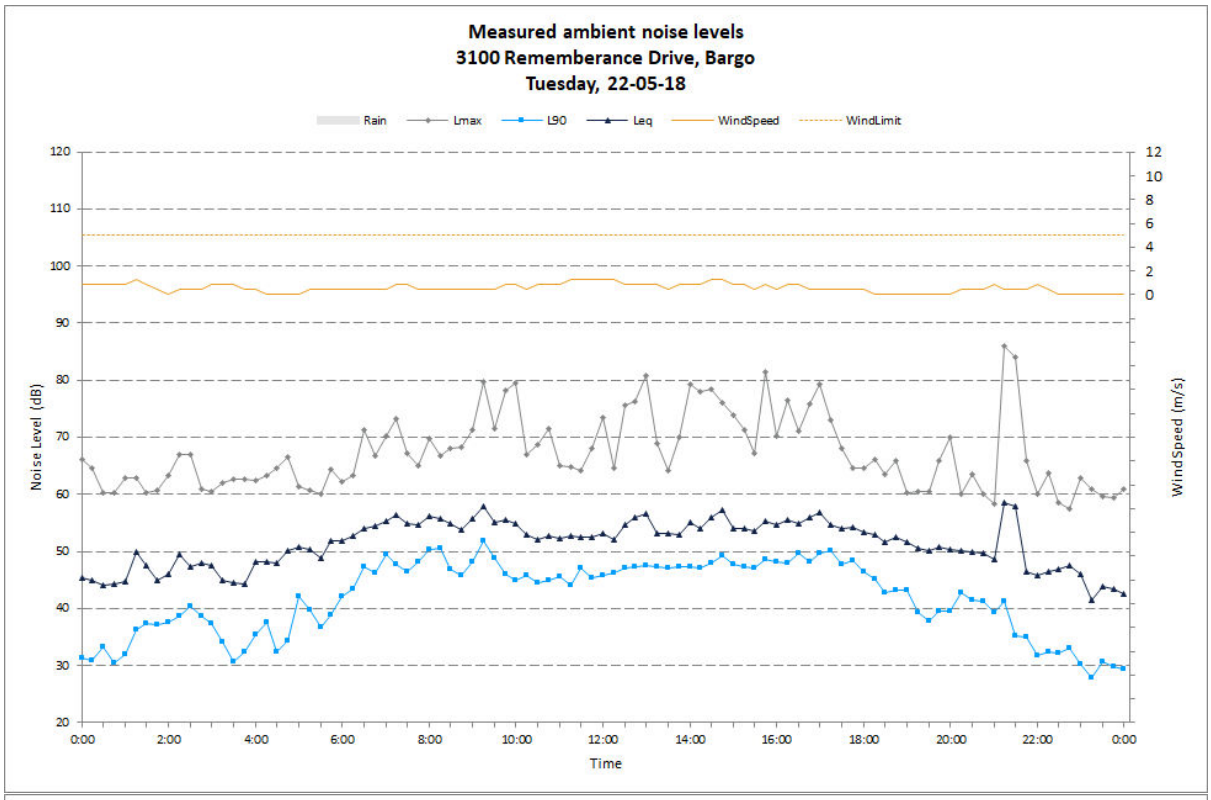

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Thursday, 17-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

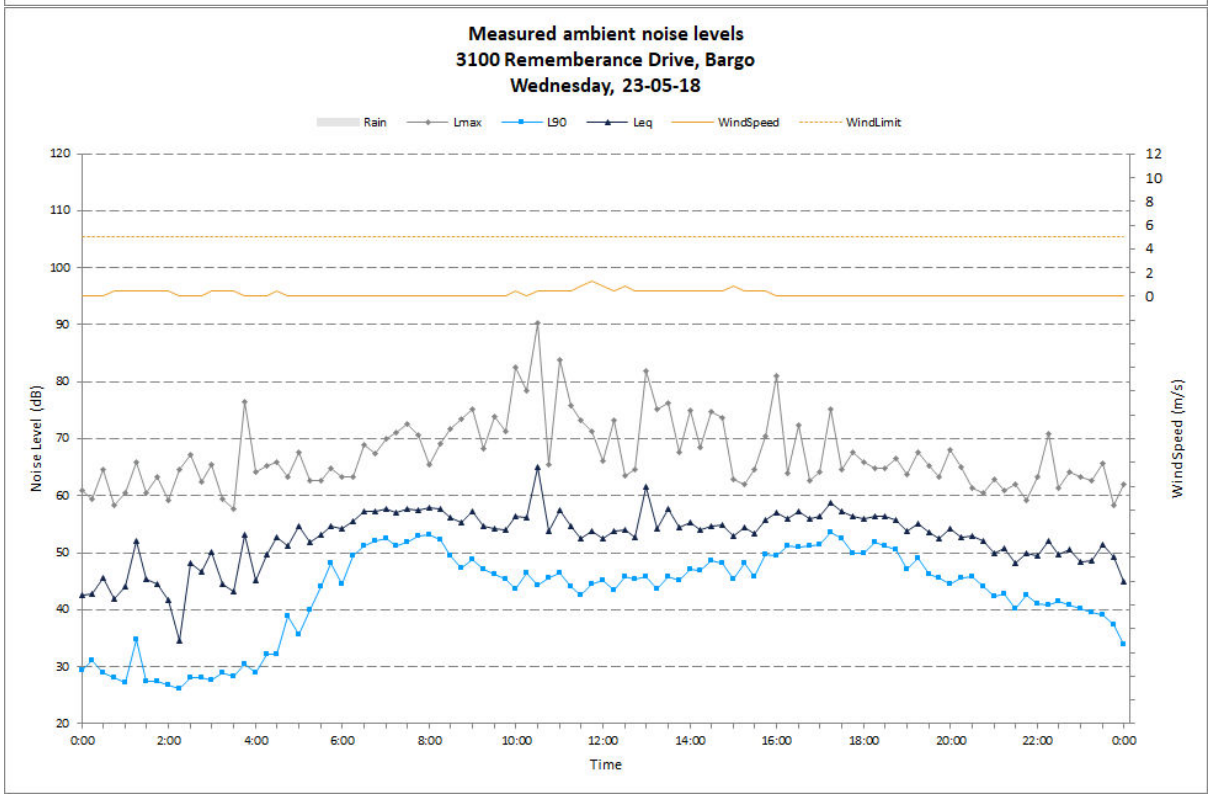

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Friday, 18-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

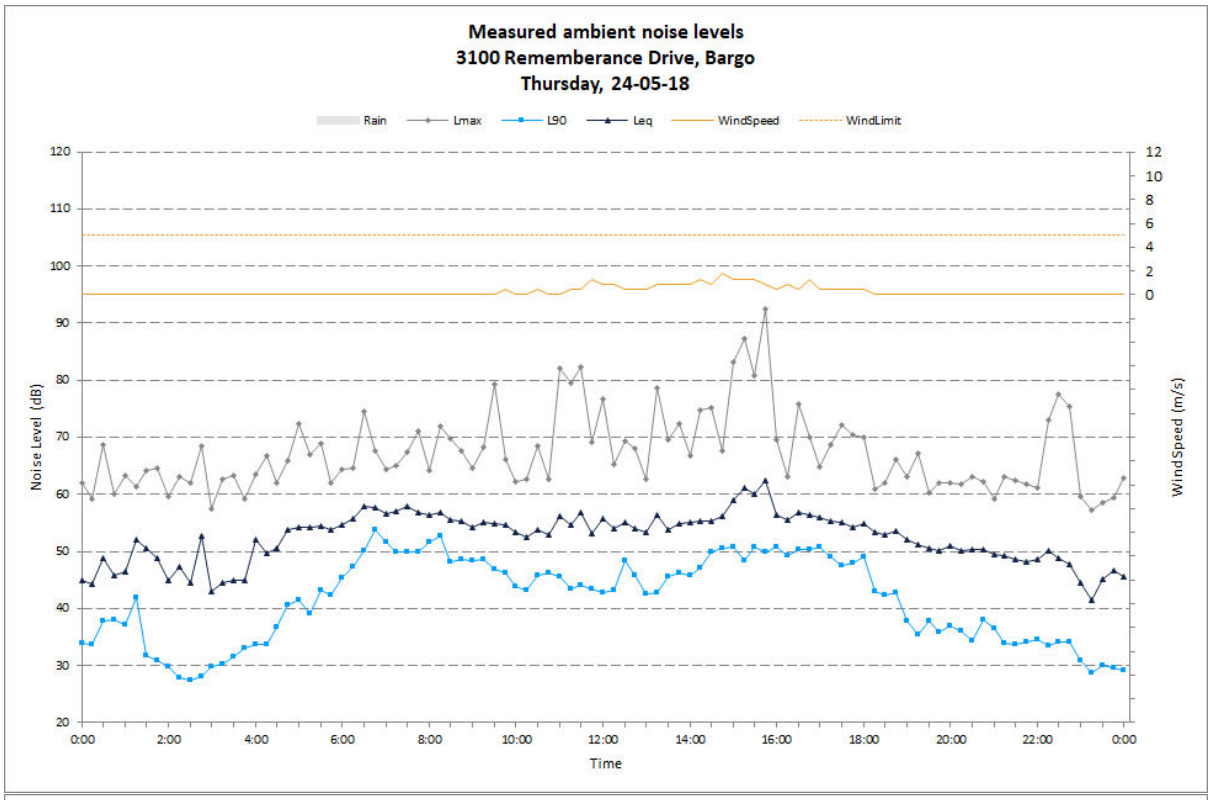

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Saturday, 19-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

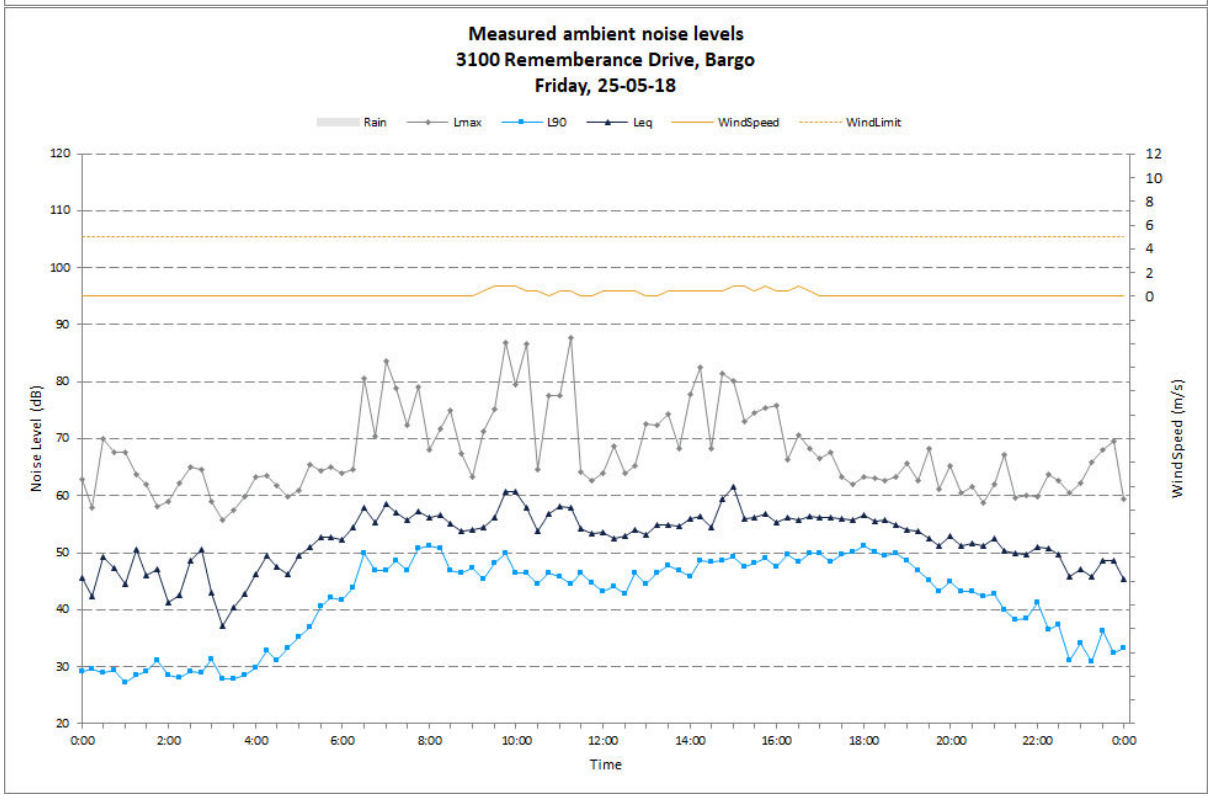

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Sunday, 20-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

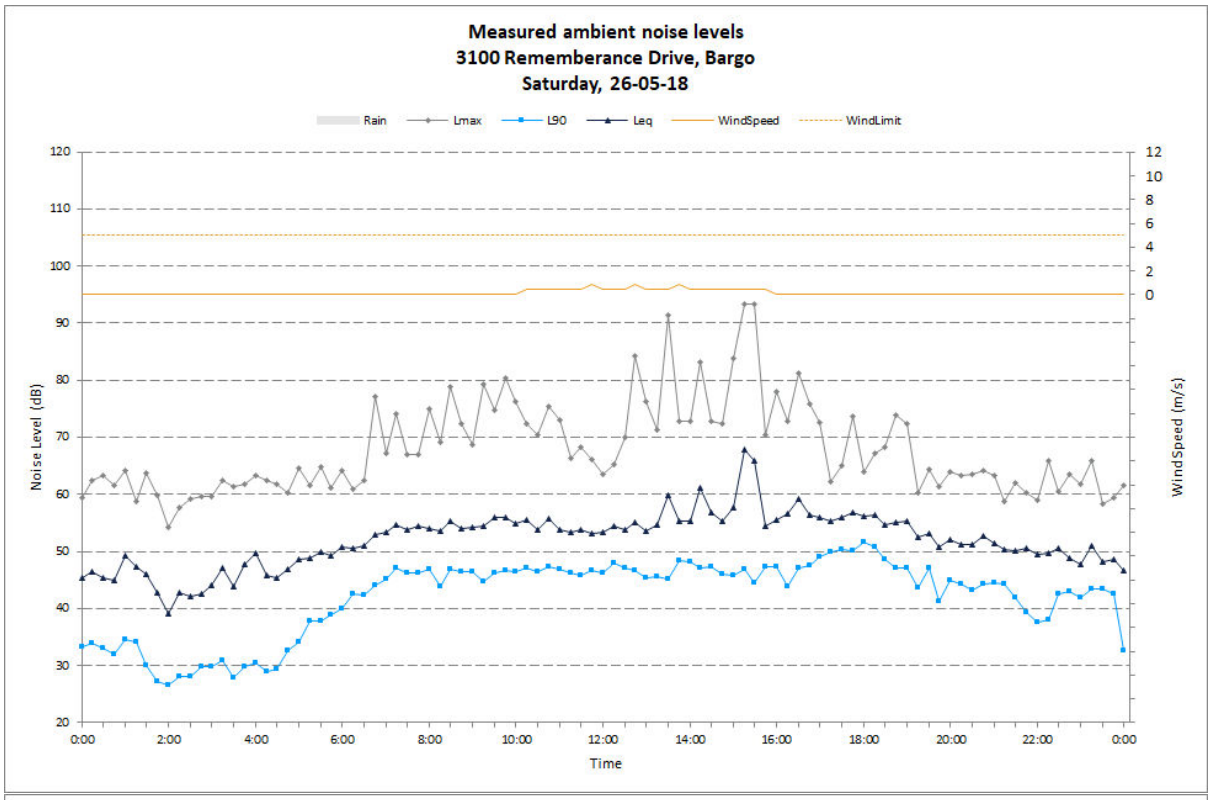

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Monday, 21-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

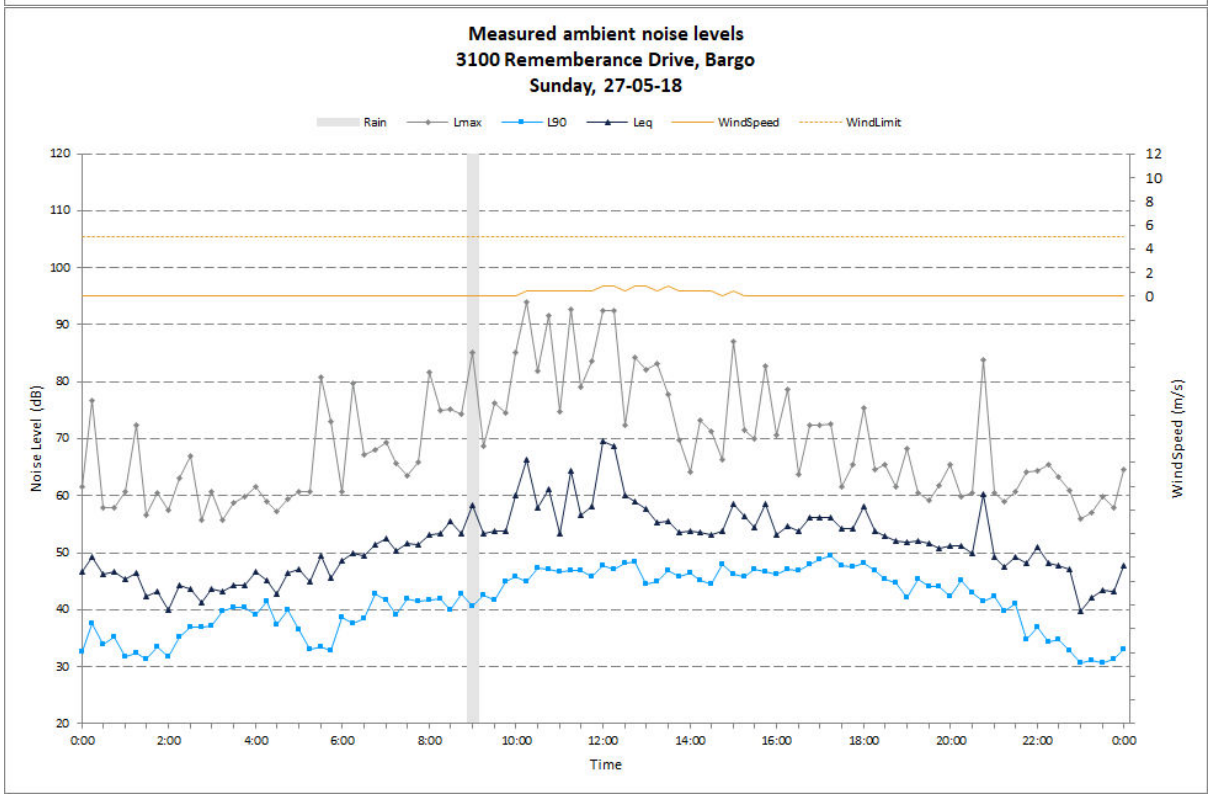

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Tuesday, 22-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

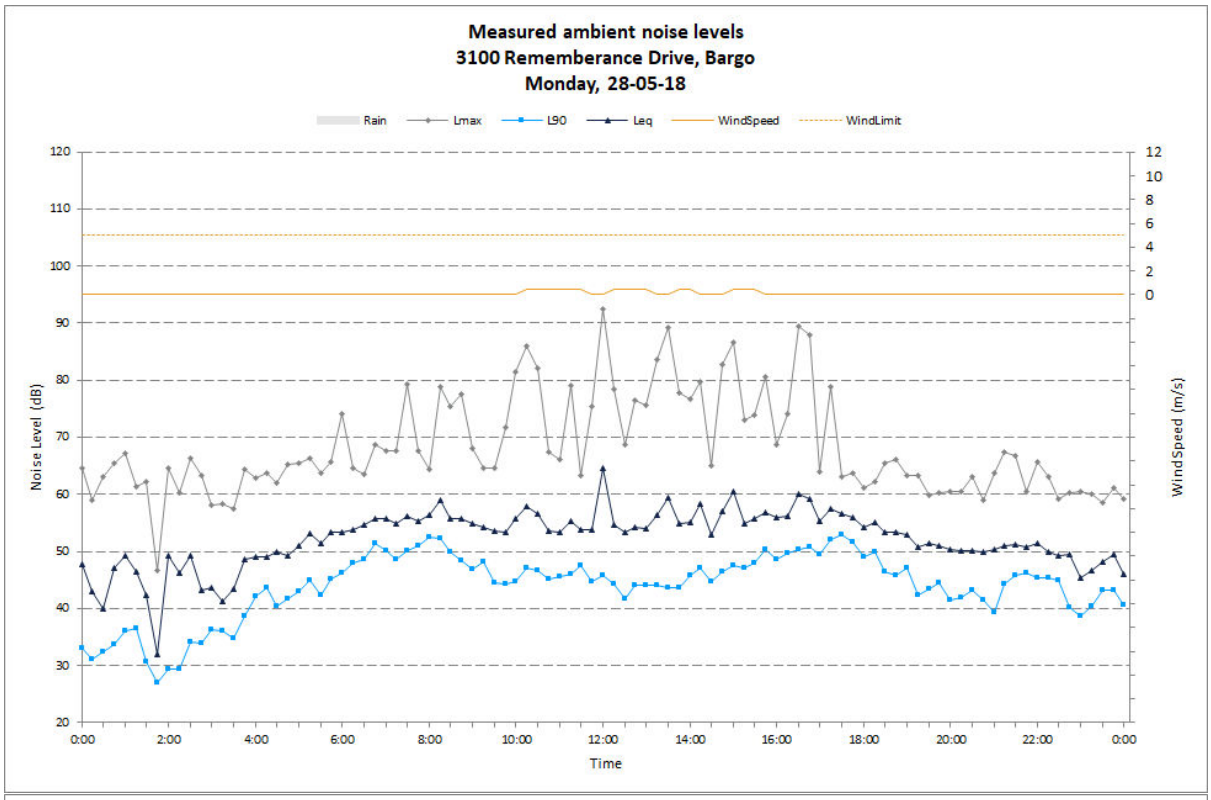

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Wednesday, 23-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00

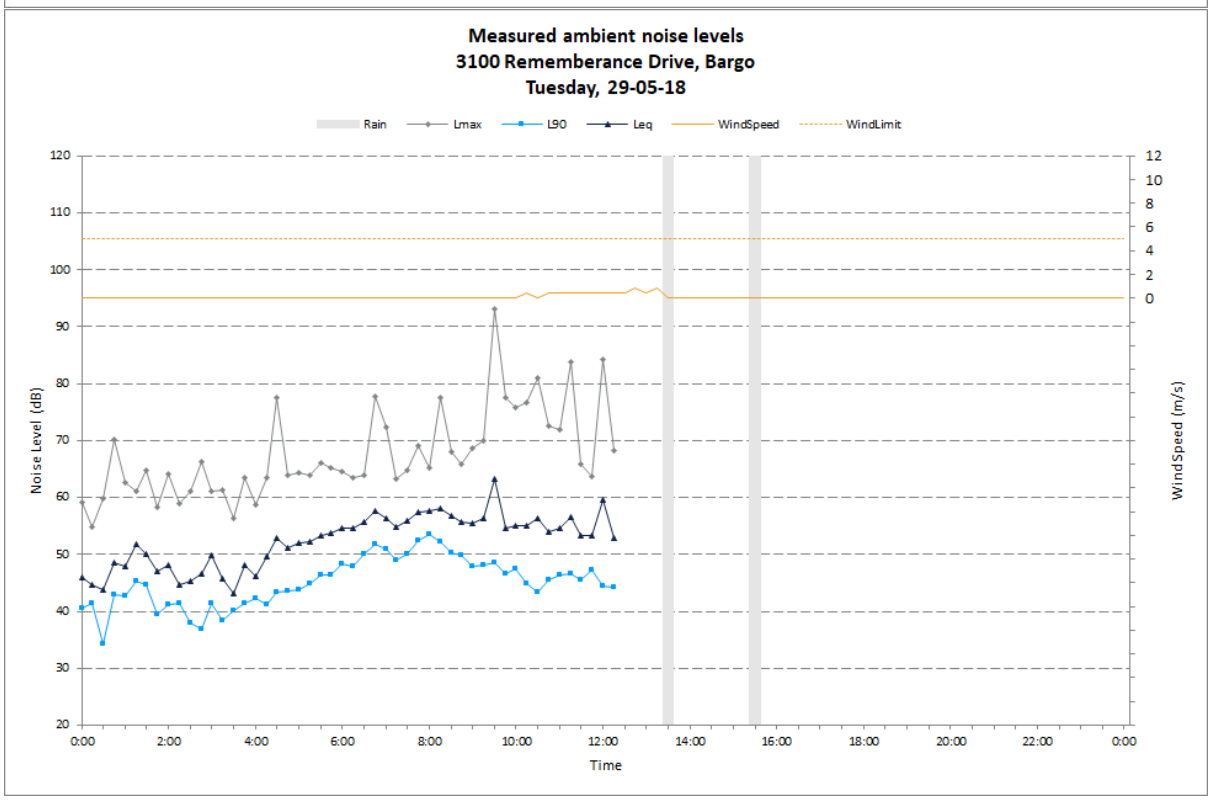

Measured ambient noise levels
3100 Rememberance Drive, Bargo
Thursday, 24-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
3100 Rememberance Drive, Bargo
Friday, 25-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
3100 Rememberance Drive, Bargo
Saturday, 26-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
3100 Rememberance Drive, Bargo
Sunday, 27-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
3100 Rememberance Drive, Bargo
Monday, 28-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
3100 Rememberance Drive, Bargo
Tuesday, 29-05-18
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time

Appendix B

Indicative noise source locations



Figure B.1 Indicative noise source locations for noise modelling – Existing Tahmoor mine

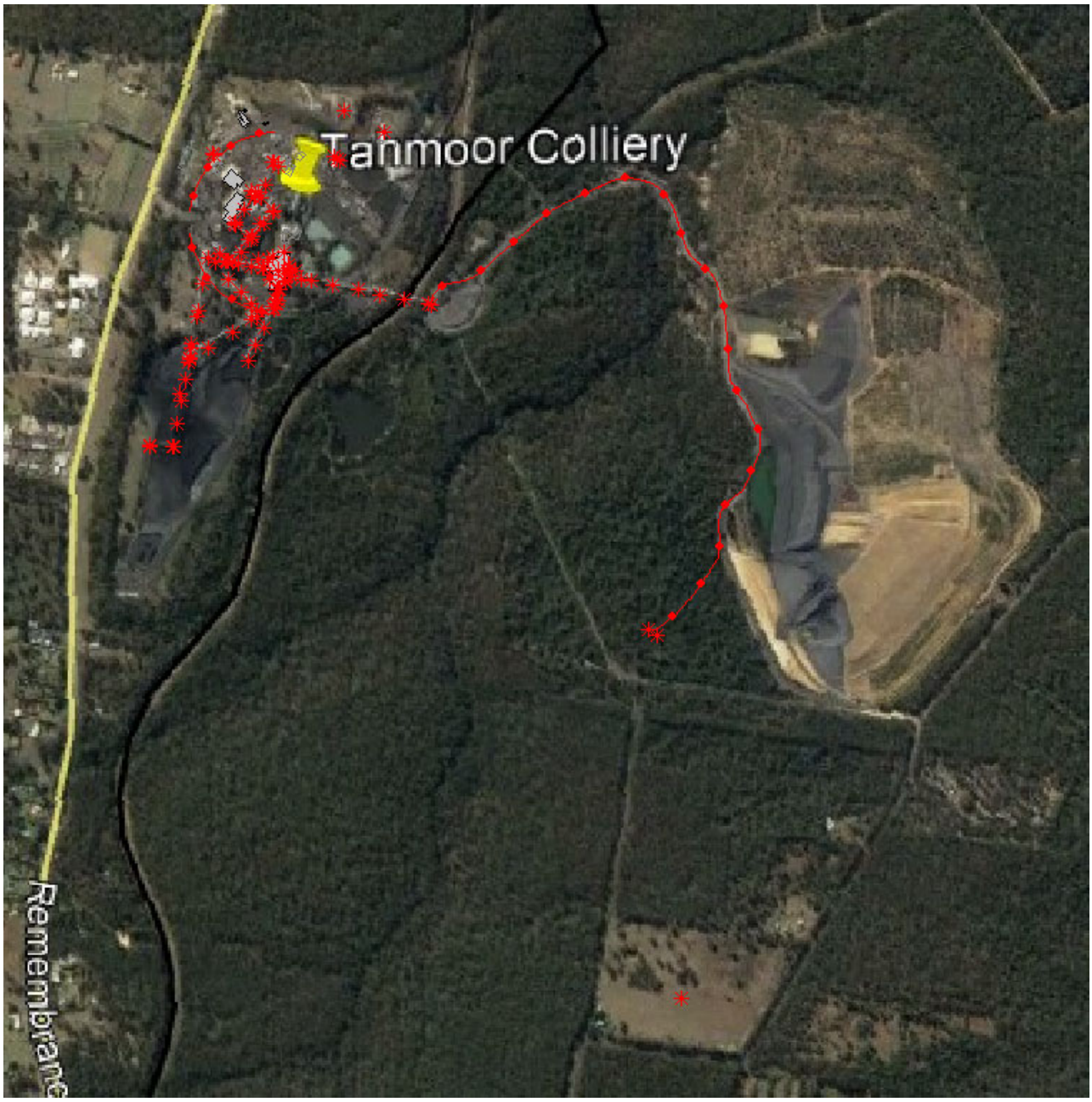


Figure B.2 Indicative noise source locations for noise modelling – TSP (Unmitigated)

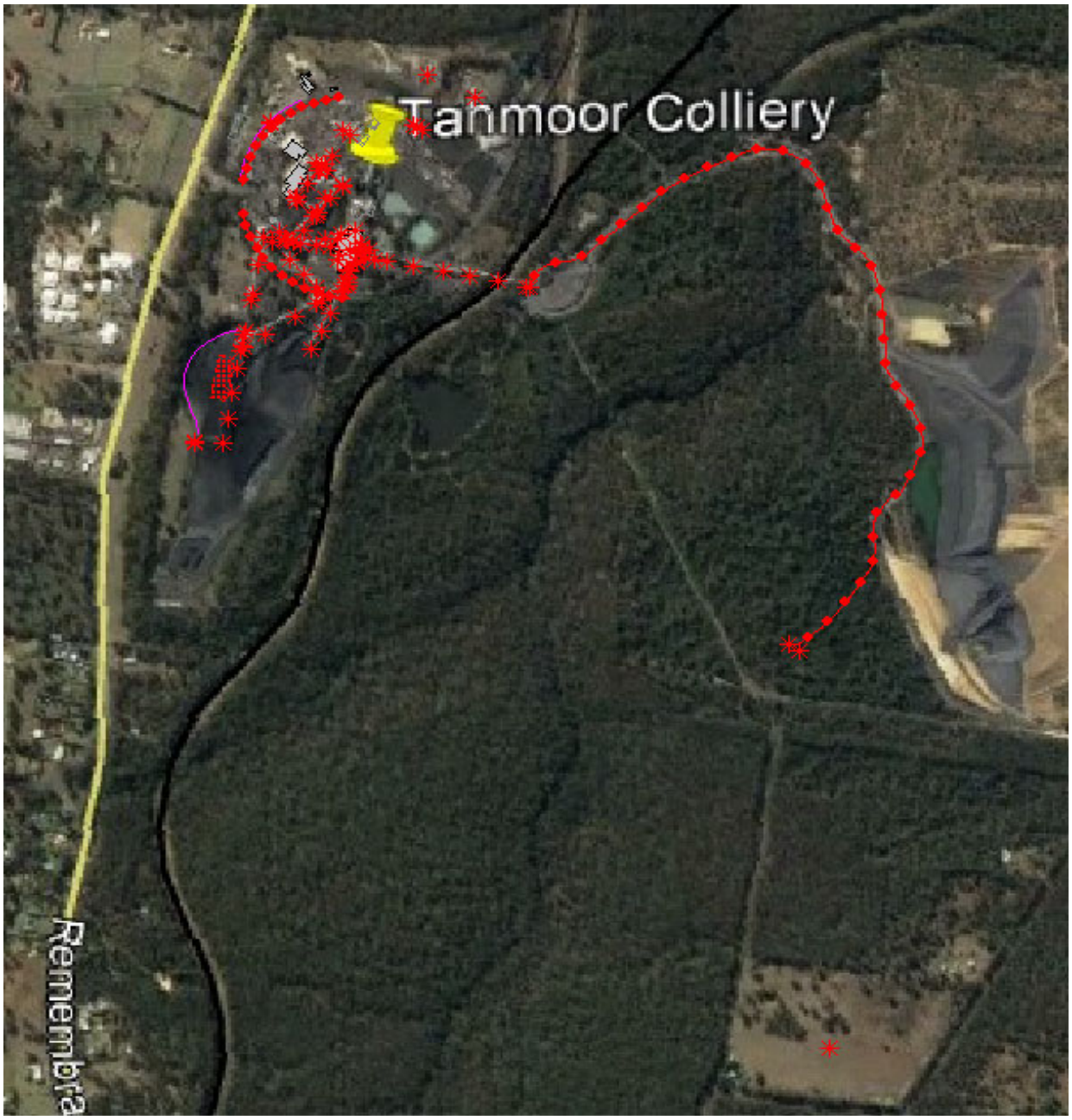


Figure B.3 Indicative noise source locations for noise modelling – TSP (Mitigated)

Appendix C

Noise modelling results

										Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
				PSNL (Intrusive)			Amenity			Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
273873	6207831		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-18	-13	-8	-18	-13	-8	-21	-16	-15	None
273890	6207952		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-18	-13	-8	-17	-12	-7	-21	-16	-15	None
273895	6207867		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
273931	6207618		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
273934	6207961		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
273941	6207850		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274004	6207945		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274006	6207883		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274039	6207692		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
274074	6208311		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274076	6208377		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274087	6208446		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274093	6208243		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274104	6208506		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274120	6208413		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274125	6208572		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274137	6208298		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274148	6208366		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274152	6208228		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274171	6208494		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274174	6208626		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274179	6208427		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274181	6208567		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274190	6207364		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274195	6208360		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274197	6208285		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274207	6207497		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274218	6208729		4	35	35	35	50	45	40	36	36	36	36	36	36	31	31	28	1	1	1	1	1	1	-4	-4	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-22	-17	-15	None
274220	6208487		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274227	6208424		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274228	6208872		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-18	-13	-8	-17	-12	-7	-21	-16	-15	None
274230	6207586		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274231	6207879		4	35	35	35	50	45	40	37	37	37	37	37	37	32	32	29	2	2	2	2	2	2	-3	-3	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-21	-16	-14	None
274248	6208555		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274263	6208481		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274273	6208903		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-18	-13	-8	-17	-12	-7	-21	-16	-15	None
274283	6208959		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-18	-13	-8	-17	-12	-7	-21	-16	-15	None
274293	6208942		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-18	-13	-8	-17	-12	-7	-21	-16	-15	None
274294	6207652		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274299	6208601		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274328	6208923		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274408	6208799		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274411	6208813		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274435	6208980		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274436	6208958		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274511	6208956		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274511	6208854		4	35	35	35	50	45	40	36	36	36	37	37	37	33	33	29	1	1	1	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-16	-11	-6	-20	-15	-14	None
274522	6207400		4	35	35	35	50	45	40	38	38	38	39	39	39	35	35	31	3	3	3	4	4	4	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-14	-9	-4	-19	-14	-12	None
274527	6209057		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274528	6209200		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274531	6208942		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
274535	6209138		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274540	6209093		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274541	6208723		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274581	6209186		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274587	6209097		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274588	6209062		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274599	6209133		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274606	6209242		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274639	6208701		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274647	6209063		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
274659	6209021		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
274663	6209167		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274664	6209081		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None

										Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
				PSNL (Intrusive)			Amenity			Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
274670	6209125		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274675	6209285		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274682	6209229		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	29	1	1	1	1	1	1	-3	-3	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-14	None
274706	6208797		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274713	6209031		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
274714	6208999		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274723	6209080		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
274730	6209158		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
274730	6209128		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
274796	6209075		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274808	6209102		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274821	6209156		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
274828	6208674		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	31	3	3	3	3	3	3	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-12	None
274829	6209248		4	35	35	35	50	45	40	36	36	36	37	37	37	33	33	29	1	1	1	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
274858	6209100		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274861	6209063		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274861	6208805		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	31	3	3	3	3	3	3	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-12	None
274865	6209144		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274884	6209564		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
274902	6208737		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	31	3	3	3	3	3	3	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-12	None
274923	6208980		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	30	3	3	3	3	3	3	-1	-1	-5	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-13	None
274939	6209096		4	35	35	35	50	45	40	37	37	37	37	37	37	34	34	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274950	6209140		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274960	6208643		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
274961	6209241		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
274980	6209000		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	30	3	3	3	3	3	3	-1	-1	-5	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-13	None
274999	6209050		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	30	3	3	3	3	3	3	-1	-1	-5	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-13	None
275022	6209227		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
275043	6208624		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275056	6209737		4	35	35	35	50	45	40	35	35	35	36	36	36	32	32	28	0	0	0	1	1	1	-3	-3	-7	0	0	0	-4	-4	-7	-18	-13	-8	-17	-12	-7	-21	-16	-15	None
275058	6208796		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275069	6209100		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	31	3	3	3	3	3	3	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-12	None
275076	6208754		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275078	6209187		4	35	35	35	50	45	40	38	38	38	37	37	37	34	34	30	3	3	3	2	2	2	-1	-1	-5	0	0	0	-4	-4	-7	-15	-10	-5	-16	-11	-6	-19	-14	-13	None
275154	6209491		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
275160	6209689		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-4	-4	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
275181	6208809		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275212	6208707		4	35	35	35	50	45	40	39	39	39	40	40	40	36	36	33	4	4	4	5	5	5	1	1	-2	0	0	0	-4	-4	-7	-14	-9	-4	-13	-8	-3	-17	-12	-10	Negligible
275218	6208798		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275220	6209091		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	31	3	3	3	3	3	3	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-12	None
275221	6209177		4	35	35	35	50	45	40	38	38	38	38	38	38	34	34	31	3	3	3	3	3	3	-1	-1	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-19	-14	-12	None
275259	6209439		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	30	2	2	2	2	2	2	-2	-2	-5	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-13	None
275282	6205483		9	44	43	35	55	45	40	35	35	35	36	36	36	34	34	30	-9	-8	0	-8	-7	1	-10	-9	-5	0	0	0	-2	-2	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
275294	6208702		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	33	4	4	4	4	4	4	0	0	-2	0	0	0	-3	-3	-6	-14	-9	-4	-14	-9	-4	-18	-13	-10	None
275315	6209547		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-4	-4	-7	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
275390	6209212		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	31	3	3	3	3	3	3	0	0	-4	0	0	0	-4	-4	-7	-15	-10	-5	-15	-10	-5	-18	-13	-12	None
275411	6205400		9	44	43	35	55	45	40	39	39	39	39	39	39	36	36	31	-5	-4	4	-5	-4	4	-8	-7	-4	0	0	0	-3	-3	-8	-19	-9	-4	-19	-9	-4	-22	-12	-12	None
275449	6209086		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275451	6209966		4	35	35	35	50	45	40	36	36	36	36	36	36	32	32	28	1	1	1	1	1	1	-3	-3	-7	0	0	0	-3	-3	-8	-17	-12	-7	-17	-12	-7	-21	-16	-15	None
275460	6206459		9	44	43	35	55	45	40	40	40	40	40	40	40	37	37	34	-5	-4	5	-4	-3	5	-7	-6	-1	0	0	0	-2	-2	-5	-19	-9	-4	-18	-8	-3	-21	-11	-9	None
275468	6205365		9	44	43	35	55	45	40	39	39	39	40	40	40	36	36	32	-5	-4	4	-5	-4	5	-8	-7	-3	0	0	0	-3	-3	-8	-19	-9	-4	-19	-9	-4	-22	-12	-11	None
275484	6209214		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	31	4	4	4	4	4	4	0	0	-4	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-12	None
275501	6205353		9	44	43	35	55	45	40	39	39	39	40	40	40	36	36	32	-5	-4	4	-4	-3	5	-8	-7	-3	0	0	0	-3	-3	-7	-19	-9	-4	-18	-8	-3	-22	-12	-11	None
275502	6205295		9	44	43	35	55	45	40	39	39	39	39	39	39	36	36	32	-5	-4	4	-5	-4	4	-8	-7	-3	0	0	0	-3	-3	-7	-19	-9	-4	-19	-9	-4	-22	-12	-11	None
275506	6206307		9	44	43	35	55	45	40	39	39	39	40	40	40	37	37	34	-5	-4	4	-4	-3	5	-7	-6	-1	0	0	0	-2	-2	-6	-19	-9	-4	-18	-8	-3	-21	-11	-9	None
275507	6209032		4	35	35	35	50	45	40	40	40	40	39	39	39	36	36	32	5	5	5	4	4	4	1	1	-3	0	0	0	-4	-4	-7	-13	-8	-3	-14	-9	-4	-17	-12	-11	Negligible
275521	6205352		9	44	43	35	55	45	40	39	39	39	39	39	39	36	36	32	-5	-4	4	-5	-4	4	-8	-7	-3	0	0	0	-3	-3	-7	-19	-9	-4	-19	-9	-4	-22	-12	-11	None
275524	6209936		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	28	1	1	1	1	1	1	-2	-2	-7	0	0	0	-3	-3	-8	-17	-12	-7	-17	-12	-7	-20	-15	-15	None
275541	6209229		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275575	6209901		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-3	-3	-8	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
275586	6205338		9	44	43	35	55	45	40	39	39	39	40	40	40	36	36	32	-5	-4	4	-4	-3	5	-8	-7	-3	0	0	0	-3	-3	-8	-19	-9	-4	-18	-8	-3	-22	-12	-11	None
275631	6209237		4	35	35	35	50	45	40	39	39	39	39	39	39	35	35	32	4	4	4	4	4	4	0	0	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-18	-13	-11	None
275633	6209912		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-3	-3	-8	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
275650	6206273		9	44	43	35	55	45	40	40	40	40	40	40	40	38	38	35	-4	-3	5	-4	-3	5	-6	-5	0	0	0	0	-2	-2	-5	-18	-8	-3	-18	-8	-3	-20	-10	-8	None

				Predicted noise emissions - noise-enhancing															Comparison to PSNL									Comparison to existing						Comparison to amenity criteria								
				PSNL (Intrusive)			Amenity			Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
275651	6205240		9	44	43	35	55	45	40	39	39	39	39	39	39	36	36	31	-5	-4	4	-5	-4	4	-8	-7	-4	0	0	0	-3	-3	-8	-19	-9	-4	-19	-9	-4	-22	-12	-12	None
275669	6209080		4	35	35	35	50	45	40	40	40	40	40	40	40	36	36	33	5	5	5	5	5	5	1	1	-2	0	0	0	-4	-4	-7	-13	-8	-3	-13	-8	-3	-17	-12	-10	Negligible
275674	6205311		9	44	43	35	55	45	40	39	39	39	39	39	39	36	36	32	-5	-4	4	-5	-4	4	-8	-7	-3	0	0	0	-3	-3	-7	-19	-9	-4	-19	-9	-4	-22	-12	-11	None
275684	6206590		9	44	43	35	55	45	40	41	41	41	42	42	42	39	39	36	-3	-2	6	-2	-1	7	-5	-4	1	0	0	0	-2	-2	-5	-17	-7	-2	-16	-6	-1	-19	-9	-7	Negligible
275700	6206997		8	46	45	37	55	45	40	43	43	43	43	43	43	41	41	38	-3	-2	6	-3	-2	6	-5	-4	1	0	0	0	-2	-2	-5	-15	-5	0	-15	-5	0	-17	-7	-5	Negligible
275701	6209909		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-3	-3	-8	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
275716	6209242		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
275717	6206243		9	44	43	35	55	45	40	44	44	44	44	44	44	39	39	36	0	1	9	0	1	9	-5	-4	1	0	0	0	-4	-4	-8	-14	-4	1	-14	-4	1	-19	-9	-7	Negligible
275731	6209126		4	35	35	35	50	45	40	40	40	40	40	40	40	36	36	33	5	5	5	5	5	5	1	1	-2	0	0	0	-4	-4	-7	-13	-8	-3	-13	-8	-3	-17	-12	-10	Negligible
275746	6206513		9	44	43	35	55	45	40	42	42	42	42	42	42	40	40	37	-2	-1	7	-2	-1	7	-4	-3	2	0	0	0	-2	-2	-5	-16	-6	-1	-16	-6	-1	-18	-8	-6	Negligible
275756	6209907		4	35	35	35	50	45	40	37	37	37	37	37	37	33	33	29	2	2	2	2	2	2	-2	-2	-6	0	0	0	-3	-3	-8	-16	-11	-6	-16	-11	-6	-20	-15	-14	None
275765	6205295		9	44	43	35	55	45	40	39	39	39	40	40	40	37	37	32	-5	-4	4	-4	-3	5	-7	-6	-3	0	0	0	-3	-3	-7	-19	-9	-4	-18	-8	-3	-21	-11	-11	None
275774	6209409		4	35	35	35	50	45	40	39	39	39	38	38	38	35	35	31	4	4	4	3	3	3	0	0	-4	0	0	0	-4	-4	-7	-14	-9	-4	-15	-10	-5	-18	-13	-12	None
275796	6205195		9	44	43	35	55	45	40	39	39	39	39	39	39	37	37	33	-5	-4	4	-5	-4	4	-7	-6	-2	0	0	0	-2	-2	-6	-19	-9	-4	-19	-9	-4	-21	-11	-10	None
275817	6206314		9	44	43	35	55	45	40	45	45	45	45	45	45	40	40	37	1	2	10	1	2	10	-4	-3	2	0	0	0	-5	-5	-8	-13	-3	2	-13	-3	2	-18	-8	-6	Negligible
275827	6206462		9	44	43	35	55	45	40	46	46	46	46	46	46	41	41	38	2	3	11	2	3	11	-3	-2	3	0	0	0	-5	-5	-8	-12	-2	3	-12	-2	3	-17	-7	-5	Marginal
275845	6205320		9	44	43	35	55	45	40	40	40	40	40	40	40	37	37	34	-4	-3	5	-4	-3	5	-7	-6	-1	0	0	0	-3	-3	-6	-18	-8	-3	-18	-8	-3	-21	-11	-9	None
275852	6209639		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	30	3	3	3	3	3	3	0	0	-5	0	0	0	-3	-3	-7	-15	-10	-5	-15	-10	-5	-18	-13	-13	None
275859	6209313		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-4	-4	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
275863	6209145		4	35	35	35	50	45	40	40	40	40	40	40	40	36	36	33	5	5	5	5	5	5	1	1	-2	0	0	0	-4	-4	-7	-13	-8	-3	-13	-8	-3	-17	-12	-10	Negligible
275882	6206268		9	44	43	35	55	45	40	45	45	45	45	45	45	41	41	37	1	2	10	1	2	10	-3	-2	2	0	0	0	-5	-5	-8	-13	-3	2	-13	-3	2	-17	-7	-6	Negligible
275886	6209821		4	35	35	35	50	45	40	37	37	37	37	37	37	34	34	30	2	2	2	2	2	2	-1	-1	-5	0	0	0	-3	-3	-8	-16	-11	-6	-16	-11	-6	-19	-14	-13	None
275903	6209412		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
275911	6206428		9	44	43	35	55	45	40	46	46	46	46	46	46	42	42	39	2	3	11	2	3	11	-2	-1	4	0	0	0	-5	-5	-8	-12	-2	3	-12	-2	3	-16	-6	-4	Marginal
275923	6209277		4	35	35	35	50	45	40	40	40	40	39	39	39	36	36	32	5	5	5	4	4	4	1	1	-3	0	0	0	-4	-4	-7	-13	-8	-3	-14	-9	-4	-17	-12	-11	Negligible
275923	6205140		9	44	43	35	55	45	40	37	37	37	38	38	38	37	37	33	-7	-6	2	-6	-5	3	-7	-6	-2	1	1	1	0	0	-4	-21	-11	-6	-20	-10	-5	-21	-11	-10	None
275925	6209973		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-4	-4	-7	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
275928	6208599		4	35	35	35	50	45	40	42	42	42	42	42	42	39	39	36	7	7	7	7	7	7	4	4	1	0	0	0	-3	-3	-6	-11	-6	-1	-11	-6	-1	-14	-9	-7	Marginal
275940	6209269		4	35	35	35	50	45	40	40	40	40	40	40	40	36	36	32	5	5	5	5	5	5	1	1	-3	0	0	0	-4	-4	-7	-13	-8	-3	-13	-8	-3	-17	-12	-11	Negligible
275942	6209122		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-4	-4	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
275960	6206210		9	44	43	35	55	45	40	45	45	45	45	45	45	41	41	37	1	2	10	1	2	10	-3	-2	2	0	0	0	-4	-4	-8	-13	-3	2	-13	-3	2	-17	-7	-6	Negligible
275968	6209369		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
275973	6209386		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
275975	6206407		9	44	43	35	55	45	40	46	46	46	47	47	47	42	42	39	2	3	11	3	4	12	-2	-1	4	0	0	0	-5	-5	-8	-12	-2	3	-11	-1	4	-16	-6	-4	Marginal
275982	6209664		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	31	3	3	3	3	3	3	0	0	-4	0	0	0	-3	-3	-8	-15	-10	-5	-15	-10	-5	-18	-13	-12	None
275992	6209797		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	30	3	3	3	3	3	3	0	0	-5	0	0	0	-3	-3	-7	-15	-10	-5	-15	-10	-5	-18	-13	-13	None
276025	6206230		9	44	43	35	55	45	40	46	46	46	46	46	46	41	41	38	2	3	11	2	3	11	-3	-2	3	0	0	0	-5	-5	-8	-12	-2	3	-12	-2	3	-17	-7	-5	Marginal
276047	6205308		9	44	43	35	55	45	40	38	38	38	39	39	39	38	38	35	-6	-5	3	-5	-4	4	-6	-5	0	1	1	1	0	0	-4	-20	-10	-5	-19	-9	-4	-20	-10	-8	None
276064	6209795		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	30	3	3	3	3	3	3	0	0	-5	0	0	0	-3	-3	-8	-15	-10	-5	-15	-10	-5	-18	-13	-13	None
276069	6206375		9	44	43	35	55	45	40	47	47	47	47	47	47	42	42	39	3	4	12	3	4	12	-2	-1	4	0	0	0	-5	-5	-8	-11	-1	4	-11	-1	4	-16	-6	-4	Marginal
276073	6208717		4	35	35	35	50	45	40	43	43	43	43	43	43	39	39	36	8	8	8	8	8	8	4	4	1	0	0	0	-4	-4	-7	-10	-5	0	-10	-5	0	-14	-9	-7	Marginal
276085	6209938		4	35	35	35	50	45	40	37	37	37	37	37	37	34	34	30	2	2	2	2	2	2	-1	-1	-5	0	0	0	-3	-3	-7	-16	-11	-6	-16	-11	-6	-19	-14	-13	None
276092	6209152		4	35	35	35	50	45	40	41	41	41	41	41	41	37	37	34	6	6	6	6	6	6	2	2	-2	0	0	0	-3	-3	-7	-12	-7	-2	-12	-7	-2	-16	-11	-10	Negligible
276098	6206262		9	44	43	35	55	45	40	46	46	46	46	46	46	42	42	38	2	3	11	2	3	11	-2	-1	3	0	0	0	-4	-4	-7	-12	-2	3	-12	-2	3	-16	-6	-5	Marginal
276126	6209839		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	30	3	3	3	3	3	3	0	0	-5	0	0	0	-3	-3	-8	-15	-10	-5	-15	-10	-5	-18	-13	-13	None
276128	6205178		9	44	43	35	55	45	40	38	38	38	38	38	38	37	37	32	-6	-5	3	-6	-5	3	-7	-6	-3	1	1	1	-1	-1	-5	-20	-10	-5	-20	-10	-5	-21	-11	-11	None
276148	6206425		9	44	43	35	55	45	40	48	48	48	48	48	48	43	43	40	4	5	13	4	5	13	-1	0	5	0	0	0	-5	-5	-8	-10	0	5	-10	0	5	-15	-5	-3	Marginal
276170	6209058		4	35	35	35	50	45	40	41	41	41	41	41	41	37	37	34	6	6	6	6	6	6	2	2	-1	0	0	0	-4	-4	-7	-12	-7	-2	-12	-7	-2	-16	-11	-9	Negligible
276203	6206248		9	44	43	35	55	45	40	46	46	46	47	47	47	42	42	39	2	3	11	3	4	12	-2	-1	4	0	0	0	-4	-4	-7	-12	-2	3	-11	-1	4	-16	-6	-4	Marginal
276206	6207523	3 Olive Lane, Bargo	8	46	45	37	55	45	40	53	56	56	53	56	56	48	51	49	7	11	19	7	11	19	2	6	12	0	0	0	-5	-5	-7	-5	8	13	-5	8	13	-10	3	6	Significant
276207	6208736		4	35	35	35	50	45	40	41	41	41	41	41	41	39	39	35	6	6	6	6	6	6	4	4	0	0	0	0	-2	-2	-6	-12	-7	-2	-12	-7	-2	-14	-9	-8	Marginal
276217	6209821		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-3	-3	-8	-14	-9	-4	-14	-9	-4	-17	-12	-12	Negligible
276224	6209139		4	35	35	35	50	45	40	41	41	41	41	41	41	37	37	34	6	6	6	6	6	6	2	2	-1	0	0	0	-4	-4	-7	-12	-7	-2	-12	-7	-2	-16	-11	-9	Negligible
276231	6204290		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	31	0	0	0	1	1	1	-1	-1	-4	0	0	0	-1	-1	-4	-18	-13	-8	-17	-12	-7	-19	-14	-12	None
276234	6206331		9	44	43	35	55	45	40	47	47	47	47	47	47	43	43	40	3	4	12	3	4	12	-1	0	5	0	0	0	-4	-4	-7	-11	-1	4	-11	-1	4	-15	-5	-3	Marginal
276281	6209124		4	35	35	35	50	45	40	41	41	41	41	41	41	37	37	35	6	6	6	6	6	6	2	2	-1	0	0	0	-4	-4	-7	-12	-7	-2	-12	-7	-2	-16	-11	-9	Negligible
276282	6206354		9	44	43	35	55	45	40	48	48	48	48	48	48	44	44	40	4	5	13	4	5	13	0	1	5	0	0	0	-4	-4	-7	-10	0	5	-10	0	5	-14	-4	-3	Marginal
276283	6205202		9	44	43	35	55	45	40	38	38	38	39	39	39	38	38	35	-6	-5	3	-5	-4	4	-6	-5	0	1	1	1	0	0	-3	-20	-10	-5	-19	-9	-4	-20	-10	-8	None
276286	6206235		9	44	43	35	55	45	40	44	44	44	45	45	45	43	43	39	0	1	9	1	2	10	-1	0	4	0	0	0	-1	-1	-5	-14	-4	1	-13	-3	2	-15	-5	-4	Marginal
276287	6204323		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276296	6209413		4	35	35	35	50	45	40	40	40	40	40	40	40	38	38	33	5	5	5	5	5	5	3	3	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-15	-10	-10	Marginal
276302	6209841		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-3	-3	-8	-14	-9	-4	-14	-9	-4	-17	-12	-12	Negligible
276317	6209532		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	32	5	5	5	5	5	5	2	2	-3	0	0	0	-3	-3	-8	-13	-8	-3	-13	-8	-3	-16	-11	-11	Negligible
276319	6209116		4	35	35	35	50	45	40	41	41	41	41	41	41	38	38	35	6	6	6	6	6	6	3	3	0	0	0	0	-4	-4	-7	-12	-7	-2	-12	-7	-2	-15	-10	-8	Marginal

										Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
				PSNL (Intrusive)			Amenity			Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
276332	6204332		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	32	1	1	1	1	1	1	0	0	-3	0	0	0	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-11	None
276334	6209925		4	35	35	35	50	45	40	38	38	38	38	38	38	35	35	30	3	3	3	3	3	3	0	0	-5	0	0	0	-3	-3	-8	-15	-10	-5	-15	-10	-5	-18	-13	-13	None
276336	6206196		9	44	43	35	55	45	40	44	44	44	45	45	45	43	43	39	0	1	9	1	2	10	-1	0	4	0	0	0	-1	-1	-5	-14	-4	1	-13	-3	2	-15	-5	-4	Marginal
276353	6205240		9	44	43	35	55	45	40	39	39	39	40	40	40	39	39	36	-5	-4	4	-4	-3	5	-5	-4	1	1	1	1	0	0	-3	-19	-9	-4	-18	-8	-3	-19	-9	-7	Negligible
276357	6204346		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	32	1	1	1	1	1	1	0	0	-3	0	0	0	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-11	None
276361	6204207		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	31	0	0	0	1	1	1	-1	-1	-4	0	0	0	-1	-1	-4	-18	-13	-8	-17	-12	-7	-19	-14	-12	None
276368	6209832		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-3	-3	-8	-14	-9	-4	-14	-9	-4	-17	-12	-12	Negligible
276375	6209133		4	35	35	35	50	45	40	41	41	41	41	41	41	38	38	35	6	6	6	6	6	6	3	3	0	0	0	0	-4	-4	-7	-12	-7	-2	-12	-7	-2	-15	-10	-8	Marginal
276375	6207092	3010 Remembrance Drive, Bargo	8	46	45	37	55	45	40	54	54	54	54	54	54	49	49	47	8	9	17	8	9	17	3	4	10	0	0	0	-6	-6	-7	-4	6	11	-4	6	11	-9	1	4	Significant
276393	6204222		4	35	35	35	50	45	40	36	36	36	36	36	36	34	34	31	1	1	1	1	1	1	-1	-1	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-19	-14	-12	None
276393	6206315	20 Caloola Road, Bargo	9	44	43	35	55	45	40	45	45	45	46	46	46	44	44	41	1	2	10	2	3	11	0	1	6	0	0	0	-1	-1	-5	-13	-3	2	-12	-2	3	-14	-4	-2	Significant
276398	6204340		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276398	6209381		4	35	35	35	50	45	40	41	41	41	41	41	41	38	38	33	6	6	6	6	6	6	3	3	-2	0	0	0	-4	-4	-8	-12	-7	-2	-12	-7	-2	-15	-10	-10	Marginal
276412	6206118		2	44	42	35	55	45	40	44	44	44	44	44	44	43	43	39	0	2	9	0	2	9	-1	1	4	1	1	1	-1	-1	-5	-14	-4	1	-14	-4	1	-15	-5	-4	Marginal
276413	6208329		4	35	35	35	50	45	40	47	47	47	47	47	47	43	43	40	12	12	12	12	12	12	8	8	5	0	0	0	-4	-4	-7	-6	-1	4	-6	-1	4	-10	-5	-3	Moderate
276421	6204354		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276429	6204228		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276432	6209913		4	35	35	35	50	45	40	38	38	38	38	38	38	36	36	30	3	3	3	3	3	3	1	1	-5	0	0	0	-3	-3	-8	-15	-10	-5	-15	-10	-5	-17	-12	-13	Negligible
276436	6205168		9	44	43	35	55	45	40	39	39	39	40	40	40	39	39	36	-5	-4	4	-4	-3	5	-5	-4	1	1	1	1	0	0	-4	-19	-9	-4	-18	-8	-3	-19	-9	-7	Negligible
276441	6209125		4	35	35	35	50	45	40	42	42	42	42	42	42	38	38	35	7	7	7	7	7	7	3	3	0	0	0	0	-4	-4	-7	-11	-6	-1	-11	-6	-1	-15	-10	-8	Marginal
276443	6206305	10 Caloola Road, Bargo	2	44	42	35	55	45	40	45	45	45	46	46	46	44	44	41	1	3	10	2	4	11	0	2	6	0	0	0	-1	-1	-5	-13	-3	2	-12	-2	3	-14	-4	-2	Significant
276445	6206028		2	44	42	35	55	45	40	44	44	44	44	44	44	43	43	40	0	2	9	0	2	9	-1	1	5	1	1	1	-1	-1	-4	-14	-4	1	-14	-4	1	-15	-5	-3	Marginal
276451	6205627		2	44	42	35	55	45	40	41	41	41	42	42	42	42	42	39	-3	-1	6	-2	0	7	-2	0	4	1	1	1	0	0	-3	-17	-7	-2	-16	-6	-1	-16	-6	-4	Marginal
276453	6209832		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	31	4	4	4	4	4	4	2	2	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-16	-11	-12	Negligible
276455	6204377		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	32	1	1	1	1	1	1	0	0	-3	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-11	None
276458	6204144		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	31	0	0	0	1	1	1	-1	-1	-4	0	0	0	-1	-1	-5	-18	-13	-8	-17	-12	-7	-19	-14	-12	None
276458	6209046		4	35	35	35	50	45	40	42	42	42	42	42	42	39	39	35	7	7	7	7	7	7	4	4	0	0	0	0	-4	-4	-7	-11	-6	-1	-11	-6	-1	-14	-9	-8	Marginal
276473	6204240		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276473	6207650	7 Olive Lane, Bargo (M3 - western end of Olive Lane)	8	46	45	37	55	45	40	55	58	58	55	58	58	51	54	51	9	13	21	9	13	21	5	9	14	0	0	0	-4	-4	-7	-3	10	15	-3	10	15	-7	6	8	Significant
276475	6205171		9	44	43	35	55	45	40	40	40	40	40	40	40	39	39	36	-5	-4	5	-4	-3	5	-5	-4	1	1	1	1	0	0	-4	-19	-9	-4	-18	-8	-3	-19	-9	-7	Negligible
276479	6206066		1	49	42	35	55	45	40	44	44	44	44	44	44	43	43	40	-5	2	9	-5	2	9	-6	1	5	1	1	1	-1	-1	-4	-14	-4	1	-14	-4	1	-15	-5	-3	Marginal
276482	6204482		4	35	35	35	50	45	40	37	37	37	37	37	37	36	36	32	2	2	2	2	2	2	1	1	-3	0	0	0	-1	-1	-5	-16	-11	-6	-16	-11	-6	-17	-12	-11	Negligible
276483	6205929	3130 Remembrance Dr, Bargo	1	49	42	35	55	45	40	43	43	43	44	44	44	44	44	41	-6	1	8	-5	2	9	-5	2	6	1	1	1	0	0	-3	-15	-5	0	-14	-4	1	-14	-4	-2	Significant
276487	6204390		4	35	35	35	50	45	40	36	36	36	37	37	37	35	35	32	1	1	1	2	2	2	0	0	-3	0	0	0	-1	-1	-5	-17	-12	-7	-16	-11	-6	-18	-13	-11	None
276488	6208953		4	35	35	35	50	45	40	43	43	43	43	43	43	39	39	36	8	8	8	8	8	8	4	4	1	0	0	0	-4	-4	-7	-10	-5	0	-10	-5	0	-14	-9	-7	Marginal
276489	6205580		1	49	42	35	55	45	40	42	42	42	42	42	42	42	42	39	-7	0	7	-7	0	7	-7	0	4	1	1	1	0	0	-3	-16	-6	-1	-16	-6	-1	-16	-6	-4	Marginal
276491	6209911		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-17	-12	-12	Negligible
276496	6205974	3126 Remembrance Dr, Bargo	1	49	42	35	55	45	40	44	44	44	44	44	44	44	44	41	-5	2	9	-5	2	9	-5	2	6	1	1	1	0	0	-3	-14	-4	1	-14	-4	1	-14	-4	-2	Significant
276501	6209823		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	31	4	4	4	4	4	4	2	2	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-16	-11	-12	Negligible
276503	6206283	4 Caloola Road, Bargo	2	44	42	35	55	45	40	45	45	45	46	46	46	44	44	41	1	3	10	2	4	11	0	2	6	0	0	0	-1	-1	-5	-13	-3	2	-12	-2	3	-14	-4	-2	Significant
276509	6209349		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
276510	6204255		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276511	6205678		1	49	42	35	55	45	40	42	42	42	43	43	43	42	42	39	-7	0	7	-6	1	8	-7	0	4	1	1	1	0	0	-3	-16	-6	-1	-15	-5	0	-16	-6	-4	Marginal
276512	6207774	6 Olive Lane, Bargo	8	46	45	37	55	45	40	54	57	57	54	57	57	50	53	51	8	12	20	8	12	20	4	8	14	0	0	0	-4	-4	-7	-4	9	14	-4	9	14	-8	5	8	Significant
276513	6205179		9	44	43	35	55	45	40	40	40	40	40	40	40	39	39	36	-4	-3	5	-4	-3	5	-5	-4	1	1	1	1	0	0	-4	-18	-8	-3	-18	-8	-3	-19	-9	-7	Negligible
276514	6204156		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	31	0	0	0	1	1	1	-1	-1	-4	0	0	0	-1	-1	-5	-18	-13	-8	-17	-12	-7	-19	-14	-12	None
276523	6204398		4	35	35	35	50	45	40	37	37	37	37	37	37	35	35	32	2	2	2	2	2	2	0	0	-3	0	0	0	-1	-1	-5	-17	-12	-7	-16	-11	-6	-18	-13	-11	None
276533	6209038		4	35	35	35	50	45	40	42	42	42	42	42	42	39	39	36	7	7	7	7	7	7	4	4	1	0	0	0	-3	-3	-7	-11	-6	-1	-11	-6	-1	-14	-9	-7	Marginal
276535	6206093		1	49	42	35	55	45	40	44	44	44	45	45	45	43	43	39	-5	2	9	-4	3	10	-6	1	4	1	1	1	-1	-1	-5	-14	-4	1	-13	-3	2	-15	-5	-4	Marginal
276540	6206361	3088 Remembrance Drive, Bargo	1	49	42	35	55	45	40	46	46	46	47	47	47	45	45	42	-3	4	11	-2	5	12	-4	3	7	0	0	0	-1	-1	-5	-12	-2	3	-11	-1	4	-13	-3	-1	Significant
276541	6205265		2	44	42	35	55	45	40	40	40	40	41	41	41	40	40	37	-4	-2	5	-3	-1	6	-4	-2	2	1	1	1	0	0	-4	-18	-8	-3	-17	-7	-2	-18	-8	-6	Negligible
276542	6205187		2	44	42	35	55	45	40	40	40	40	40	40	40	39	39	36	-4	-2	5	-4	-2	5	-5	-3	1	1	1	1	0	0	-4	-18	-8	-3	-18	-8	-3	-19	-9	-7	Negligible
276547	6206139		1	49	42	35	55	45	40	44	44	44	45	45	45	43	43	40	-5	2	9	-4	3	10	-6	1	5	1	1	1	-1	-1	-5	-14	-4	1	-13	-3	2	-15	-5	-3	Marginal
276548	6206179		1	49	42	35	55	45	40	44	44	44	44	44	44	42	42	40	-5	2	9	-5	2	9	-7	0	5	0	0	0	-2	-2	-4	-14	-4	1	-14	-4	1	-16	-6	-3	Marginal
276548	6204257		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276553	6204153		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	31	0	0	0	1	1	1	-1	-1	-4	0	0	0	-1	-1	-5	-18	-13	-8	-17	-12	-7	-19	-14	-12	None
276554	6206319	3092 Remembrance Drive, Bargo	1	49	42	35	55	45	40	46	46	46	46	46	46	45	45	41	-3	4	11	-3	4	11	-4	3	6	0	0	0	-1	-1	-5	-12	-2	3	-12	-2	3	-13	-3	-2	Significant
276562	6206400	3084 Remembrance Drive, Bargo	1	49	42	35	55	45	40	47	47	47	47	47	47	45	45	42	-2	5	12	-2	5	12	-4	3	7	0	0	0	-2	-2	-5	-11	-1	4	-11	-1	4	-13	-3	-1	Significant
276562	6204388		4	35	35	35	50	45	40	36	36	36	37	37	37	35	35	32	1	1	1	2	2	2	0	0	-3	0	0	0	-1	-1	-5	-17	-12	-7	-16	-11	-6	-18	-13	-11	None
276566	6206441	3080 Remembrance Drive, Bargo	1	49	42	35	55	45	40	47	47	47	48	48	48	46	46	43	-2	5	12	-1	6	13	-3	4	8	0	0	0	-2	-2	-4	-11	-1	4	-10	0	5	-12	-2	0	Significant
276570	6209899		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-3	-3	-8	-14	-9	-4	-14	-9	-4	-17	-12	-12	Negligible
276575	6205367		1	49	42	35	55	45	40	41	41	41	42	42	42	41	41	37	-8	-1	6	-7	0	7	-8	-1	2	1	1	1	0	0	-4	-17	-7	-2	-16	-6	-1	-17	-7	-6	Negligible
276578	6206476	3076 Remembrance Drive, Bargo	1	49	42	35	55	45	40	47	47	47	48	48	48	45	45	43	-2	5	12	-1	6	13	-4	3	8	0	0	0	-2	-2	-4	-11	-1	4	-10	0	5	-13	-3	0	Significant
276578	6204177		4	35	35	35	50	45	40	36	36	36	36	36	36	34	34	31	1	1	1	1	1	1	-1	-1	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-19	-14	-12	None

				PSNL (Intrusive)			Amenity			Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
										Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
276581	6205199		2	44	42	35	55	45	40	40	40	40	41	41	41	40	40	36	-4	-2	5	-3	-1	6	-4	-2	1	1	1	1	0	0	-4	-18	-8	-3	-17	-7	-2	-18	-8	-7	Negligible
276589	6204265		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	1	1	1	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276597	6209813		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	31	4	4	4	4	4	4	2	2	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-16	-11	-12	Negligible
276599	6204411		4	35	35	35	50	45	40	37	37	37	37	37	37	35	35	32	2	2	2	2	2	2	0	0	-3	0	0	0	-1	-1	-5	-16	-11	-6	-16	-11	-6	-18	-13	-11	None
276604	6207752	4 Olive Lane, Bargo	8	46	45	37	55	45	40	55	58	58	55	58	58	51	54	51	9	13	21	9	13	21	5	9	14	0	0	0	-4	-4	-7	-3	10	15	-3	10	15	-7	6	8	Significant
276606	6208858		4	35	35	35	50	45	40	44	44	44	44	44	44	40	40	37	9	9	9	9	9	9	5	5	2	0	0	0	-3	-3	-7	-9	-4	1	-9	-4	1	-13	-8	-6	Marginal
276619	6204492		4	35	35	35	50	45	40	37	37	37	37	37	37	36	36	32	2	2	2	2	2	2	1	1	-3	0	0	0	-1	-1	-5	-16	-11	-6	-16	-11	-6	-17	-12	-11	Negligible
276623	6204174		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276625	6205725		1	49	42	35	55	45	40	43	43	43	44	44	44	43	43	40	-6	1	8	-5	2	9	-6	1	5	1	1	1	0	0	-3	-15	-5	0	-14	-4	1	-15	-5	-3	Marginal
276629	6204273		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	1	1	1	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276644	6204399		4	35	35	35	50	45	40	36	36	36	37	37	37	36	36	32	1	1	1	2	2	2	1	1	-3	1	1	1	-1	-1	-4	-17	-12	-7	-16	-11	-6	-18	-13	-11	Negligible
276651	6207240	M2 - College and church					40 (in	40 (in	40 (in	34	37	37	34	37	37	31	34	32										0	0	0	-3	-3	-4	-6	-3	-3	-6	-3	-3	-9	-6	-8	n/a
276652	6209402		4	35	35	35	50	45	40	41	41	41	41	41	41	38	38	33	6	6	6	6	6	6	3	3	-2	0	0	0	-3	-3	-7	-12	-7	-2	-12	-7	-2	-15	-10	-10	Marginal
276653	6204197		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276654	6205211		1	49	42	35	55	45	40	38	38	38	38	38	38	37	37	33	-11	-4	3	-11	-4	3	-12	-5	-2	0	0	0	-1	-1	-5	-20	-10	-5	-20	-10	-5	-21	-11	-10	None
276659	6204069		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	30	0	0	0	1	1	1	-1	-1	-5	0	0	0	-1	-1	-5	-18	-13	-8	-17	-12	-7	-19	-14	-13	None
276661	6204288		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	1	1	1	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276663	6209046		4	35	35	35	50	45	40	42	42	42	42	42	42	39	39	36	7	7	7	7	7	7	4	4	1	0	0	0	-3	-3	-7	-11	-6	-1	-11	-6	-1	-14	-9	-7	Marginal
276670	6204422		4	35	35	35	50	45	40	36	36	36	37	37	37	36	36	32	1	1	1	2	2	2	1	1	-3	1	1	1	-1	-1	-4	-17	-12	-7	-16	-11	-6	-17	-12	-11	Negligible
276675	6209894		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-17	-12	-12	Negligible
276678	6206499	3085 Remembrance Drive, Bargo	1	49	42	35	55	45	40	48	48	48	49	49	49	46	46	44	-1	6	13	0	7	14	-3	4	9	0	0	0	-2	-2	-5	-10	0	5	-9	1	6	-12	-2	1	Significant
276679	6204200		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	31	0	0	0	1	1	1	0	0	-4	1	1	1	-1	-1	-4	-18	-13	-8	-17	-12	-7	-18	-13	-12	None
276679	6204542		4	35	35	35	50	45	40	37	37	37	38	38	38	36	36	33	2	2	2	3	3	3	1	1	-3	1	1	1	-1	-1	-4	-16	-11	-6	-15	-10	-5	-17	-12	-11	Negligible
276683	6208822		4	35	35	35	50	45	40	44	44	44	44	44	44	41	41	37	9	9	9	9	9	9	6	6	2	0	0	0	-3	-3	-7	-9	-4	1	-9	-4	1	-12	-7	-6	Moderate
276685	6204691		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	33	-6	-4	3	-6	-4	3	-7	-5	-2	1	1	1	-1	-1	-4	-20	-10	-5	-20	-10	-5	-21	-11	-10	None
276687	6206360	3090 Remembrance Dr, Bargo	1	49	42	35	55	45	40	47	47	47	48	48	48	46	46	42	-2	5	12	-1	6	13	-3	4	7	1	1	1	-1	-1	-5	-11	-1	4	-10	0	5	-12	-2	-1	Significant
276691	6205220		1	49	42	35	55	45	40	38	38	38	38	38	38	37	37	33	-11	-4	3	-11	-4	3	-12	-5	-2	0	0	0	-1	-1	-5	-20	-10	-5	-20	-10	-5	-21	-11	-10	None
276699	6209919		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	31	4	4	4	4	4	4	1	1	-4	0	0	0	-2	-2	-8	-15	-10	-5	-14	-9	-4	-17	-12	-12	Negligible
276708	6204295		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	1	1	1	-1	-1	-4	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276711	6209399		4	35	35	35	50	45	40	41	41	41	41	41	41	38	38	34	6	6	6	6	6	6	3	3	-1	0	0	0	-3	-3	-7	-12	-7	-2	-12	-7	-2	-15	-10	-9	Marginal
276713	6204858		2	44	42	35	55	45	40	38	38	38	39	39	39	38	38	34	-6	-4	3	-5	-3	4	-6	-4	-1	1	1	1	-1	-1	-4	-20	-10	-5	-19	-9	-4	-20	-10	-9	None
276719	6205090		1	49	42	35	55	45	40	40	40	40	40	40	40	38	38	36	-9	-2	5	-9	-2	5	-11	-4	1	0	0	0	-2	-2	-4	-18	-8	-3	-18	-8	-3	-20	-10	-7	Negligible
276720	6205177		1	49	42	35	55	45	40	37	37	37	37	37	37	35	35	32	-12	-5	2	-12	-5	2	-14	-7	-3	0	0	0	-2	-2	-5	-21	-11	-6	-21	-11	-6	-23	-13	-11	None
276722	6204424		2	44	42	35	55	45	40	36	36	36	37	37	37	36	36	32	-8	-6	1	-7	-5	2	-8	-6	-3	1	1	1	-1	-1	-4	-22	-12	-7	-21	-11	-6	-22	-12	-11	None
276729	6204741		2	44	42	35	55	45	40	38	38	38	39	39	39	37	37	34	-6	-4	3	-5	-3	4	-7	-5	-1	1	1	1	-1	-1	-4	-20	-10	-5	-19	-9	-4	-21	-11	-9	None
276733	6209543		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
276736	6204036		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	30	0	0	0	1	1	1	-1	-1	-5	0	0	0	-1	-1	-5	-18	-13	-8	-18	-13	-8	-19	-14	-13	None
276736	6204132		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276737	6209794		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	31	4	4	4	4	4	4	2	2	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-16	-11	-12	Negligible
276744	6204556		2	44	42	35	55	45	40	37	37	37	38	38	38	36	36	33	-7	-5	2	-6	-4	3	-8	-6	-2	1	1	1	-1	-1	-4	-21	-11	-6	-20	-10	-5	-22	-12	-10	None
276752	6204770		1	49	42	35	55	45	40	38	38	38	39	39	39	38	38	34	-11	-4	3	-10	-3	4	-11	-4	-1	1	1	1	-1	-1	-4	-20	-10	-5	-19	-9	-4	-20	-10	-9	None
276757	6204207		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276760	6204123		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276761	6204984		1	49	42	35	55	45	40	39	39	39	40	40	40	39	39	35	-10	-3	4	-9	-2	5	-10	-3	0	1	1	1	-1	-1	-4	-19	-9	-4	-18	-8	-3	-19	-9	-8	None
276767	6204434		2	44	42	35	55	45	40	36	36	36	37	37	37	36	36	32	-8	-6	1	-7	-5	2	-8	-6	-3	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-22	-12	-11	None
276770	6204938		1	49	42	35	55	45	40	39	39	39	40	40	40	38	38	35	-10	-3	4	-9	-2	5	-11	-4	0	1	1	1	-1	-1	-4	-19	-9	-4	-18	-8	-3	-20	-10	-8	None
276770	6207717	2 Olive Lane, Bargo	1	49	42	35	55	45	40	57	60	60	57	60	60	54	57	53	8	18	25	8	18	25	5	15	18	0	0	0	-3	-3	-7	-1	12	17	-1	12	17	-4	9	10	Significant
276783	6204364		2	44	42	35	55	45	40	36	36	36	37	37	37	35	35	32	-8	-6	1	-7	-5	2	-9	-7	-3	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-23	-13	-11	None
276789	6204904		1	49	42	35	55	45	40	39	39	39	40	40	40	38	38	34	-10	-3	4	-9	-2	5	-11	-4	-1	1	1	1	-1	-1	-4	-19	-9	-4	-18	-8	-3	-20	-10	-9	None
276793	6209461		4	35	35	35	50	45	40	40	40	40	40	40	40	38	38	33	5	5	5	5	5	5	3	3	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-15	-10	-10	Marginal
276795	6204329		2	44	42	35	55	45	40	36	36	36	37	37	37	35	35	31	-8	-6	1	-7	-5	2	-9	-7	-4	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-23	-13	-12	None
276801	6209563		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
276804	6204234		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	31	1	1	1	1	1	1	0	0	-4	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-12	None
276806	6209580		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
276808	6204122		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	30	1	1	1	1	1	1	0	0	-5	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-13	None
276811	6204465		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	32	-12	-5	2	-12	-5	2	-13	-6	-3	1	1	1	-1	-1	-5	-21	-11	-6	-21	-11	-6	-22	-12	-11	None
276814	6209696		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	32	4	4	4	4	4	4	2	2	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-16	-11	-11	Negligible
276828	6204056		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	30	0	0	0	1	1	1	-1	-1	-5	1	1	1	-1	-1	-5	-18	-13	-8	-17	-12	-7	-19	-14	-13	None
276831	6204167		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	30	1	1	1	1	1	1	0	0	-5	0	0	0	-1	-1	-5	-17	-12	-7	-17	-12	-7	-18	-13	-13	None
276840	6204417		1	49	42	35	55	45	40	36	36	36	37	37	37	36	36	32	-13	-6	1	-12	-5	2	-13	-6	-3	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-22	-12	-11	None
276840	6209669		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	32	4	4	4	4	4	4	2	2	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-16	-11	-11	Negligible
276848	6209925		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	31	4	4	4	4	4	4	2	2	-4	0	0	0	-2	-2	-8	-14	-9	-4	-14	-9	-4	-16	-11	-12	Negligible
276853	6204276		2	44	42	35	55	45	40	36	36	36	37	37	37	35	35	31	-8	-6	1	-7	-5	2	-9	-7	-4	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-23	-13	-12	None
276862	6204375		1	49	42	35	55	45	40	36	36	36	37	37	37	36	36	31	-13	-6	1	-12	-5	2	-13	-6	-4	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-22	-12	-12	None

				PSNL (Intrusive)			Amenity			Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
										Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
276877	6205084		1	49	42	35	55	45	40	40	40	40	41	41	41	39	39	35	-9	-2	5	-8	-1	6	-10	-3	0	1	1	1	-1	-1	-5	-18	-8	-3	-17	-7	-2	-19	-9	-8	None
276883	6204213		2	44	42	35	55	45	40	36	36	36	36	36	36	35	35	31	-8	-6	1	-8	-6	1	-9	-7	-4	1	1	1	-1	-1	-5	-22	-12	-7	-22	-12	-7	-23	-13	-12	None
276883	6204350		1	49	42	35	55	45	40	36	36	36	37	37	37	36	36	31	-13	-6	1	-12	-5	2	-13	-6	-4	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-22	-12	-12	None
276885	6208969		4	35	35	35	50	45	40	43	43	43	42	42	42	39	39	36	8	8	8	7	7	7	4	4	1	0	0	0	-3	-3	-7	-10	-5	0	-11	-6	-1	-14	-9	-7	Marginal
276893	6204047		4	35	35	35	50	45	40	35	35	35	36	36	36	34	34	30	0	0	0	1	1	1	-1	-1	-5	1	1	1	-1	-1	-5	-18	-13	-8	-17	-12	-7	-19	-14	-13	None
276908	6205007		2	44	42	35	55	45	40	39	39	39	40	40	40	39	39	34	-5	-3	4	-4	-2	5	-5	-3	-1	1	1	1	0	0	-5	-19	-9	-4	-18	-8	-3	-19	-9	-9	None
276909	6208791		2	44	42	35	55	45	40	42	42	42	42	42	42	40	40	36	-2	0	7	-2	0	7	-4	-2	1	0	0	0	-2	-2	-6	-16	-6	-1	-16	-6	-1	-18	-8	-7	Negligible
276912	6204323		1	49	42	35	55	45	40	36	36	36	37	37	37	35	35	31	-13	-6	1	-12	-5	2	-14	-7	-4	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-23	-13	-12	None
276923	6204892		2	44	42	35	55	45	40	39	39	39	40	40	40	38	38	34	-5	-3	4	-4	-2	5	-6	-4	-1	1	1	1	0	0	-5	-19	-9	-4	-18	-8	-3	-20	-10	-9	None
276929	6204280		1	49	42	35	55	45	40	36	36	36	37	37	37	35	35	31	-13	-6	1	-12	-5	2	-14	-7	-4	1	1	1	-1	-1	-5	-22	-12	-7	-21	-11	-6	-23	-13	-12	None
276929	6208832		2	44	42	35	55	45	40	41	41	41	41	41	41	40	40	36	-3	-1	6	-3	-1	6	-4	-2	1	0	0	0	-2	-2	-6	-17	-7	-2	-17	-7	-2	-18	-8	-7	Negligible
276934	6205134		2	44	42	35	55	45	40	40	40	40	41	41	41	39	39	35	-4	-2	5	-3	-1	6	-5	-3	0	1	1	1	-1	-1	-5	-18	-8	-3	-17	-7	-2	-19	-9	-8	None
276936	6208105	2900 Remembrance Drive, Bargo	7	46	42	39	55	45	40	50	50	50	50	50	50	47	47	44	4	8	11	4	8	11	1	5	5	0	0	0	-3	-3	-6	-8	2	7	-8	2	7	-11	-1	1	Marginal
276943	6209689		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	32	4	4	4	4	4	4	2	2	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-16	-11	-11	Negligible
276944	6204752		1	49	42	35	55	45	40	38	38	38	39	39	39	38	38	33	-11	-4	3	-10	-3	4	-11	-4	-2	1	1	1	-1	-1	-5	-20	-10	-5	-19	-9	-4	-20	-10	-10	None
276944	6204070		2	44	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-9	-7	0	-8	-6	1	-10	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
276950	6209800		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
276964	6205064		2	44	42	35	55	45	40	40	40	40	41	41	41	39	39	35	-4	-2	5	-3	-1	6	-5	-3	0	1	1	1	-1	-1	-5	-18	-8	-3	-17	-7	-2	-19	-9	-8	None
276965	6203990		2	44	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-9	-7	0	-8	-6	1	-10	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
276967	6209192		4	35	35	35	50	45	40	42	42	42	41	41	41	38	38	35	7	7	7	6	6	6	3	3	0	0	0	0	-4	-4	-7	-11	-6	-1	-12	-7	-2	-15	-10	-8	Marginal
276977	6209297		4	35	35	35	50	45	40	42	42	42	42	42	42	39	39	34	7	7	7	7	7	7	4	4	-1	0	0	0	-3	-3	-7	-11	-6	-1	-11	-6	-1	-14	-9	-9	Marginal
276991	6204007		2	44	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-9	-7	0	-8	-6	1	-10	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277007	6204170		1	49	42	35	55	45	40	35	35	35	36	36	36	35	35	30	-14	-7	0	-13	-6	1	-14	-7	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-23	-13	-13	None
277012	6204136		1	49	42	35	55	45	40	35	35	35	36	36	36	35	35	30	-14	-7	0	-13	-6	1	-14	-7	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-23	-13	-13	None
277021	6204108		1	49	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-14	-7	0	-13	-6	1	-15	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277026	6204068		2	44	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-9	-7	0	-8	-6	1	-10	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277027	6209628		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
277046	6204034		1	49	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-14	-7	0	-13	-6	1	-15	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277054	6208082	2897 Remembrance Drive, Bargo	7	46	42	39	55	45	40	49	49	49	49	49	49	48	48	45	3	7	10	3	7	10	2	6	6	0	0	0	-2	-2	-5	-9	1	6	-9	1	6	-10	0	2	Significant
277058	6204005		1	49	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-14	-7	0	-13	-6	1	-15	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277059	6209721		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	32	4	4	4	4	4	4	2	2	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-16	-11	-11	Negligible
277064	6204655		2	44	42	35	55	45	40	38	38	38	39	39	39	37	37	33	-6	-4	3	-5	-3	4	-7	-5	-2	1	1	1	-1	-1	-5	-20	-10	-5	-19	-9	-4	-21	-11	-10	None
277069	6204699		4	35	35	35	50	45	40	38	38	38	39	39	39	37	37	33	3	3	3	4	4	4	2	2	-2	1	1	1	-1	-1	-5	-15	-10	-5	-14	-9	-4	-16	-11	-10	Negligible
277076	6208332	2885 Remembrance Drive, Bargo	7	46	42	39	55	45	40	47	47	47	47	47	47	45	45	42	1	5	8	1	5	8	-1	3	3	0	0	0	-2	-2	-5	-11	-1	4	-11	-1	4	-13	-3	-1	Marginal
277085	6205176		4	35	35	35	50	45	40	40	40	40	41	41	41	40	40	35	5	5	5	6	6	6	5	5	0	1	1	1	0	0	-5	-13	-8	-3	-12	-7	-2	-13	-8	-8	Marginal
277088	6209839		4	35	35	35	50	45	40	39	39	39	39	39	39	36	36	32	4	4	4	4	4	4	1	1	-3	0	0	0	-3	-3	-7	-14	-9	-4	-14	-9	-4	-17	-12	-11	Negligible
277090	6204435		2	44	42	35	55	45	40	37	37	37	38	38	38	36	36	32	-7	-5	2	-6	-4	3	-8	-6	-3	1	1	1	-1	-1	-5	-21	-11	-6	-20	-10	-5	-22	-12	-11	None
277099	6204590		4	35	35	35	50	45	40	37	37	37	38	38	38	37	37	32	2	2	2	3	3	3	2	2	-3	1	1	1	-1	-1	-5	-16	-11	-6	-15	-10	-5	-16	-11	-11	Negligible
277100	6204845		4	35	35	35	50	45	40	39	39	39	40	40	40	38	38	33	4	4	4	5	5	5	3	3	-2	1	1	1	-1	-1	-5	-14	-9	-4	-13	-8	-3	-15	-10	-10	Marginal
277112	6209583		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
277123	6203976		1	49	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-14	-7	0	-13	-6	1	-15	-8	-5	1	1	1	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277134	6204386		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	32	-7	-5	2	-7	-5	2	-8	-6	-3	1	1	1	-1	-1	-5	-21	-11	-6	-21	-11	-6	-22	-12	-11	None
277161	6204790		4	35	35	35	50	45	40	39	39	39	40	40	40	38	38	34	4	4	4	5	5	5	3	3	-1	1	1	1	-1	-1	-5	-14	-9	-4	-13	-8	-3	-15	-10	-9	Marginal
277161	6209132		1	49	42	35	55	45	40	42	42	42	42	42	42	39	39	36	-7	0	7	-7	0	7	-10	-3	1	0	0	0	-3	-3	-6	-16	-6	-1	-16	-6	-1	-19	-9	-7	Negligible
277163	6204604		4	35	35	35	50	45	40	38	38	38	39	39	39	37	37	33	3	3	3	4	4	4	2	2	-2	1	1	1	-1	-1	-5	-15	-10	-5	-14	-9	-4	-16	-11	-10	Negligible
277165	6205011		4	35	35	35	50	45	40	39	39	39	39	39	39	37	37	34	4	4	4	4	4	4	2	2	-1	0	0	0	-2	-2	-5	-14	-9	-4	-14	-9	-4	-16	-11	-9	Negligible
277165	6204287		2	44	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-9	-7	0	-8	-6	1	-10	-8	-5	0	0	0	-2	-2	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277182	6204619		4	35	35	35	50	45	40	38	38	38	39	39	39	37	37	33	3	3	3	4	4	4	2	2	-2	1	1	1	-1	-1	-5	-15	-10	-5	-14	-9	-4	-16	-11	-10	Negligible
277183	6209074		1	49	42	35	55	45	40	42	42	42	42	42	42	40	40	36	-7	0	7	-7	0	7	-9	-2	1	0	0	0	-2	-2	-6	-16	-6	-1	-16	-6	-1	-18	-8	-7	Negligible
277242	6209655		4	35	35	35	50	45	40	40	40	40	40	40	40	37	37	33	5	5	5	5	5	5	2	2	-2	0	0	0	-3	-3	-7	-13	-8	-3	-13	-8	-3	-16	-11	-10	Negligible
277248	6204496		4	35	35	35	50	45	40	37	37	37	37	37	37	35	35	32	2	2	2	2	2	2	0	0	-3	0	0	0	-2	-2	-5	-16	-11	-6	-16	-11	-6	-18	-13	-11	None
277253	6209893		4	35	35	35	50	45	40	38	38	38	38	38	38	36	36	31	3	3	3	3	3	3	1	1	-4	0	0	0	-3	-3	-7	-15	-10	-5	-15	-10	-5	-17	-12	-12	Negligible
277289	6209222		1	49	42	35	55	45	40	41	41	41	41	41	41	40	40	35	-8	-1	6	-8	-1	6	-9	-2	0	0	0	0	-2	-2	-6	-17	-7	-2	-17	-7	-2	-18	-8	-8	None
277348	6209158		1	49	42	35	55	45	40	42	42	42	42	42	42	40	40	36	-7	0	7	-7	0	7	-9	-2	1	0	0	0	-2	-2	-6	-16	-6	-1	-16	-6	-1	-18	-8	-7	Negligible
277356	6204385		4	35	35	35	50	45	40	36	36	36	37	37	37	35	35	32	1	1	1	2	2	2	0	0	-3	0	0	0	-2	-2	-5	-17	-12	-7	-16	-11	-6	-18	-13	-11	None
277392	6209359		1	49	42	35	55	45	40	38	38	38	38	38	38	36	36	32	-11	-4	3	-11	-4	3	-13	-6	-3	0	0	0	-2	-2	-6	-20	-10	-5	-20	-10	-5	-22	-12	-11	None
277407	6204949		4	35	35	35	50	45	40	39	39	39	39	39	39	38	38	35	4	4	4	4	4	4	3	3	0	0	0	0	-1	-1	-4	-14	-9	-4	-14	-9	-4	-15	-10	-8	Marginal
277418	6209766		4	35	35	35	50	45	40	38	38	38	38	38	38	36	36	32	3	3	3	3	3	3	1	1	-3	0	0	0	-2	-2	-6	-15	-10	-5	-15	-10	-5	-17	-12	-11	Negligible
277432	6209437		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	31	-12	-5	2	-12	-5	2	-13	-6	-4	0	0	0	-2	-2	-6	-21	-11	-6	-21	-11	-6	-22	-12	-12	None
277452	6209234		1	49	42	35	55	45	40	41	41	41	41	41	41	39	39	35	-8	-1	6	-8	-1	6	-10	-3	0	0	0	0	-2	-2	-6	-17	-7	-2	-17	-7	-2	-19	-9	-8	None
277510	6209310		1	49	42	35	55	45	40	42	42	42	42	42	42	40	40	34	-7	0	7	-7	0	7	-9	-2	-1	0	0	0	-1	-1	-7	-16	-6	-1	-16	-6	-1	-18	-8	-9	None
277536	6209341		1	49	42	35	55	45	40	41	41	41	41	41	41	40	40	34	-8	-1	6	-8	-1	6	-9	-2	-1	0	0	0	-1	-1	-7	-17	-7	-2	-17	-7	-2	-18	-8	-9	None
277554	6209361		1	49	42	35	55	45	40	41	41	41	41	41	41	40	40	34	-8	-1	6	-8	-1	6	-10	-3	-1	0	0	0	-1	-1	-7	-17	-7	-2	-17	-7	-2	-19	-9	-9	None
277557	6209545		1	49	42	35	55	45	40	37	37	37	37	37	37	35	35	31	-12	-5	2	-12	-5	2	-14	-7	-4	0	0	0	-2	-2	-6	-21	-11	-6	-21	-11	-6	-23	-13	-12	None

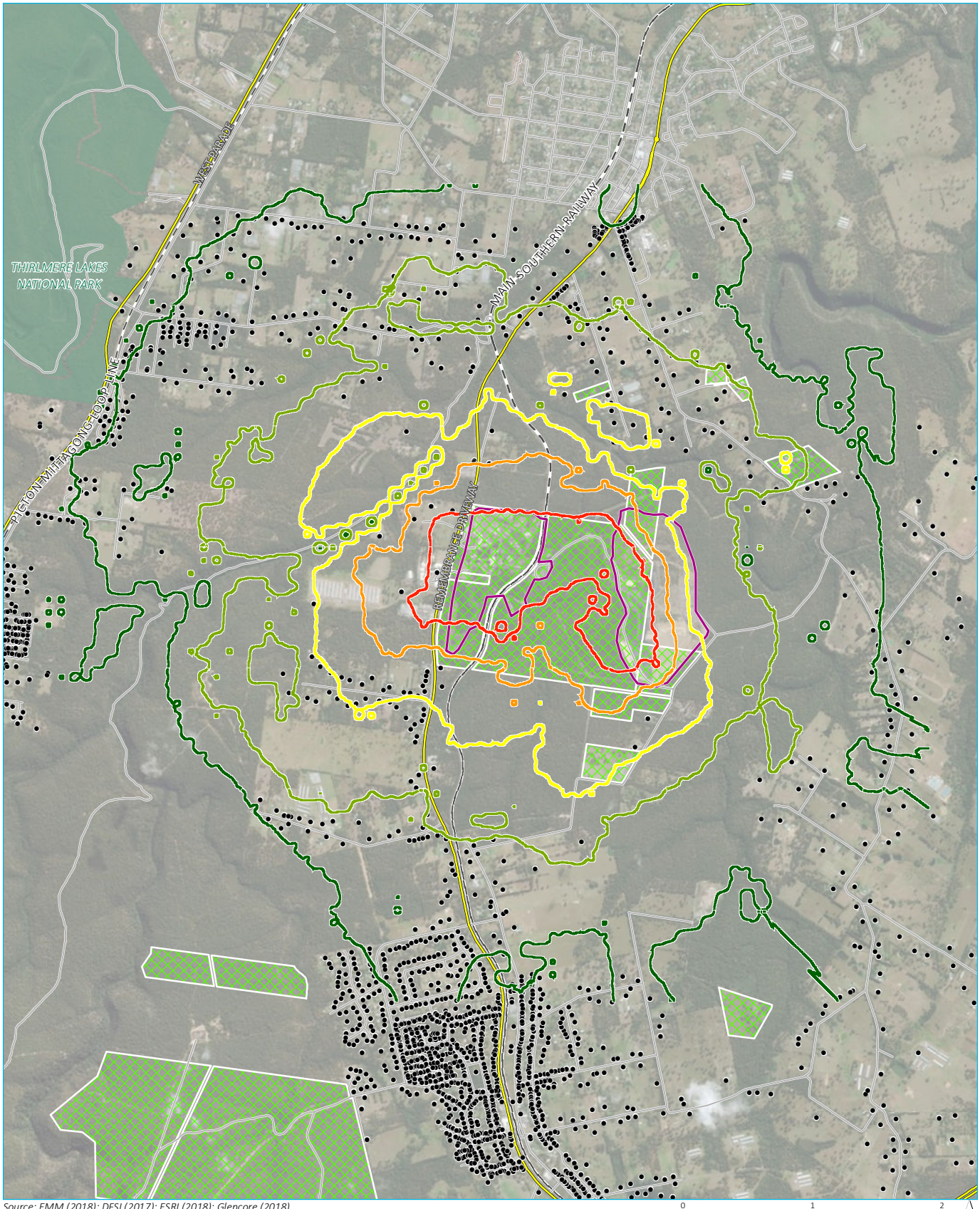
				PSNL (Intrusive)			Amenity			Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
										Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
277569	6209377		1	49	42	35	55	45	40	41	41	41	41	41	41	39	39	34	-8	-1	6	-8	-1	6	-10	-3	-1	0	0	0	-1	-1	-7	-17	-7	-2	-17	-7	-2	-19	-9	-9	None
277582	6209394		1	49	42	35	55	45	40	40	40	40	40	40	40	39	39	34	-9	-2	5	-9	-2	5	-10	-3	-1	0	0	0	-1	-1	-7	-18	-8	-3	-18	-8	-3	-19	-9	-9	None
277599	6209409		1	49	42	35	55	45	40	40	40	40	40	40	40	39	39	34	-9	-2	5	-9	-2	5	-10	-3	-1	0	0	0	-2	-2	-7	-18	-8	-3	-18	-8	-3	-19	-9	-9	None
277615	6209417		1	49	42	35	55	45	40	40	40	40	40	40	40	39	39	33	-9	-2	5	-9	-2	5	-10	-3	-2	0	0	0	-2	-2	-7	-18	-8	-3	-18	-8	-3	-19	-9	-10	None
277634	6209436		1	49	42	35	55	45	40	39	39	39	39	39	39	36	36	33	-10	-3	4	-10	-3	4	-13	-6	-2	0	0	0	-2	-2	-6	-19	-9	-4	-19	-9	-4	-22	-12	-10	None
277637	6208618		6	39	37	37	50	45	40	45	45	45	45	45	45	44	44	39	6	8	8	6	8	8	5	7	2	0	0	0	-1	-1	-6	-8	-3	2	-8	-3	2	-9	-4	-4	Moderate
277649	6209455		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	31	-12	-5	2	-12	-5	2	-13	-6	-4	0	0	0	-2	-2	-6	-21	-11	-6	-21	-11	-6	-22	-12	-12	None
277656	6209721		2	44	42	35	55	45	40	36	36	36	36	36	36	34	34	30	-8	-6	1	-8	-6	1	-10	-8	-5	0	0	0	-2	-2	-6	-22	-12	-7	-22	-12	-7	-24	-14	-13	None
277658	6209204		6	39	37	37	50	45	40	41	41	41	41	41	41	40	40	35	2	4	4	2	4	4	1	3	-2	0	0	0	-1	-1	-6	-12	-7	-2	-12	-7	-2	-13	-8	-8	Marginal
277670	6209175		6	39	37	37	50	45	40	41	41	41	41	41	41	40	40	35	2	4	4	2	4	4	1	3	-2	0	0	0	-1	-1	-7	-12	-7	-2	-12	-7	-2	-13	-8	-8	Marginal
277675	6209054		6	39	37	37	50	45	40	43	43	43	43	43	43	42	42	37	4	6	6	4	6	6	3	5	0	0	0	0	-1	-1	-7	-10	-5	0	-10	-5	0	-11	-6	-6	Marginal
277679	6209292		2	44	42	35	55	45	40	38	38	38	38	38	38	36	36	32	-6	-4	3	-6	-4	3	-8	-6	-3	0	0	0	-2	-2	-6	-20	-10	-5	-20	-10	-5	-22	-12	-11	None
277722	6209311		2	44	42	35	55	45	40	38	38	38	38	38	38	36	36	31	-6	-4	3	-6	-4	3	-8	-6	-4	0	0	0	-2	-2	-6	-20	-10	-5	-20	-10	-5	-22	-12	-12	None
277737	6209274		6	39	37	37	50	45	40	38	38	38	38	38	38	36	36	32	-1	1	1	-1	1	1	-3	-1	-5	0	0	0	-2	-2	-6	-15	-10	-5	-15	-10	-5	-17	-12	-11	None
277768	6205158	80 Charlies Point Road (south of new vent fan)	4	35	35	35	50	45	40	42	42	42	42	42	42	40	40	36	7	7	7	7	7	7	5	5	1	0	0	0	-2	-2	-6	-11	-6	-1	-11	-6	-1	-13	-8	-7	Marginal
277777	6209005		6	39	37	37	50	45	40	43	43	43	43	43	43	42	42	36	4	6	6	4	6	6	3	5	-1	0	0	0	-1	-1	-7	-10	-5	0	-10	-5	0	-11	-6	-7	Marginal
277811	6209160		6	39	37	37	50	45	40	40	40	40	40	40	40	39	39	33	1	3	3	1	3	3	0	2	-4	0	0	0	-1	-1	-7	-14	-9	-4	-13	-8	-3	-14	-9	-10	Negligible
277834	6209771		1	49	42	35	55	45	40	38	38	38	38	38	38	37	37	31	-11	-4	3	-11	-4	3	-12	-5	-4	0	0	0	-1	-1	-7	-20	-10	-5	-20	-10	-5	-21	-11	-12	None
277846	6208869		6	39	37	37	50	45	40	44	44	44	44	44	44	43	43	37	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-9	-4	1	-9	-4	1	-10	-5	-6	Moderate
277851	6209190		6	39	37	37	50	45	40	39	39	39	39	39	39	38	38	33	0	2	2	0	2	2	-1	1	-4	0	0	0	-1	-1	-6	-14	-9	-4	-14	-9	-4	-15	-10	-10	Negligible
277865	6209901		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-7	-5	2	-7	-5	2	-8	-6	-5	0	0	0	-2	-2	-7	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
277868	6209855		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	31	-12	-5	2	-12	-5	2	-13	-6	-4	0	0	0	-2	-2	-7	-21	-11	-6	-21	-11	-6	-22	-12	-12	None
277868	6209870		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	31	-12	-5	2	-12	-5	2	-13	-6	-4	0	0	0	-2	-2	-7	-21	-11	-6	-21	-11	-6	-22	-12	-12	None
277869	6209885		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-12	-5	2	-12	-5	2	-13	-6	-5	0	0	0	-2	-2	-7	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
277870	6209839		1	49	42	35	55	45	40	38	38	38	38	38	38	36	36	31	-11	-4	3	-11	-4	3	-13	-6	-4	0	0	0	-1	-1	-7	-20	-10	-5	-20	-10	-5	-22	-12	-12	None
277886	6208795		6	39	37	37	50	45	40	44	44	44	44	44	44	43	43	37	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-9	-4	1	-9	-4	1	-10	-5	-6	Moderate
277889	6209828		1	49	42	35	55	45	40	38	38	38	38	38	38	36	36	31	-11	-4	3	-11	-4	3	-13	-6	-4	0	0	0	-1	-1	-7	-20	-10	-5	-20	-10	-5	-22	-12	-12	None
277891	6209883		1	49	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-12	-5	2	-12	-5	2	-13	-6	-5	0	0	0	-2	-2	-7	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
277899	6209850		1	49	42	35	55	45	40	37	37	37	38	38	38	36	36	31	-12	-5	2	-11	-4	3	-13	-6	-4	0	0	0	-1	-1	-7	-21	-11	-6	-20	-10	-5	-22	-12	-12	None
277903	6209821		1	49	42	35	55	45	40	36	36	36	37	37	37	35	35	31	-13	-6	1	-12	-5	2	-14	-7	-4	0	0	0	-2	-2	-6	-22	-12	-7	-21	-11	-6	-23	-13	-12	None
277907	6209126		6	39	37	37	50	45	40	42	42	42	42	42	42	41	41	35	3	5	5	3	5	5	2	4	-2	0	0	0	-1	-1	-6	-11	-6	-1	-11	-6	-1	-12	-7	-8	Marginal
277915	6209842		1	49	42	35	55	45	40	36	36	36	36	36	36	35	35	30	-13	-6	1	-13	-6	1	-14	-7	-5	0	0	0	-1	-1	-5	-22	-12	-7	-22	-12	-7	-23	-13	-13	None
277925	6209856		1	49	42	35	55	45	40	35	35	35	36	36	36	34	34	30	-14	-7	0	-13	-6	1	-15	-8	-5	0	0	0	-1	-1	-5	-23	-13	-8	-22	-12	-7	-24	-14	-13	None
277934	6209547		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-7	-5	2	-7	-5	2	-8	-6	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
277937	6209041		6	39	37	37	50	45	40	42	42	42	43	43	43	41	41	36	3	5	5	4	6	6	2	4	-1	0	0	0	-1	-1	-7	-11	-6	-1	-10	-5	0	-12	-7	-7	Marginal
277958	6209355		6	39	37	37	50	45	40	39	39	39	39	39	39	38	38	34	0	2	2	0	2	2	-1	1	-3	0	0	0	-1	-1	-5	-14	-9	-4	-14	-9	-4	-15	-10	-9	Negligible
277968	6209115		6	39	37	37	50	45	40	42	42	42	42	42	42	41	41	35	3	5	5	3	5	5	2	4	-2	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-12	-7	-8	Marginal
277972	6208608		6	39	37	37	50	45	40	45	45	45	45	45	45	44	44	38	6	8	8	6	8	8	5	7	1	0	0	0	-1	-1	-7	-8	-3	2	-8	-3	2	-9	-4	-5	Moderate
277977	6209266		6	39	37	37	50	45	40	41	41	41	41	41	41	40	40	34	2	4	4	2	4	4	1	3	-3	0	0	0	-1	-1	-6	-12	-7	-2	-12	-7	-2	-13	-8	-9	Marginal
277990	6208940		6	39	37	37	50	45	40	43	43	43	43	43	43	42	42	36	4	6	6	4	6	6	3	5	-1	0	0	0	-1	-1	-6	-10	-5	0	-10	-5	0	-11	-6	-7	Marginal
277995	6208547		6	39	37	37	50	45	40	45	45	45	45	45	45	45	45	38	6	8	8	6	8	8	6	8	1	0	0	0	-1	-1	-7	-8	-3	2	-8	-3	2	-8	-3	-5	Moderate
277997	6208487		6	39	37	37	50	45	40	46	46	46	46	46	46	45	45	39	7	9	9	7	9	9	6	8	2	0	0	0	-1	-1	-7	-7	-2	3	-7	-2	3	-8	-3	-4	Moderate
278010	6209695		2	44	42	35	55	45	40	37	37	37	38	38	38	36	36	32	-7	-5	2	-6	-4	3	-8	-6	-3	0	0	0	-1	-1	-5	-21	-11	-6	-20	-10	-5	-22	-12	-11	None
278017	6208249	M6 - southern end of Stratford Rd	6	39	37	37	50	45	40	46	46	46	46	46	46	44	44	39	7	9	9	7	9	9	5	7	2	0	0	0	-2	-2	-7	-7	-2	3	-7	-2	3	-9	-4	-4	Moderate
278018	6209251		6	39	37	37	50	45	40	41	41	41	41	41	41	40	40	34	2	4	4	2	4	4	1	3	-3	0	0	0	-1	-1	-6	-12	-7	-2	-12	-7	-2	-13	-8	-9	Marginal
278021	6208391		6	39	37	37	50	45	40	46	46	46	47	47	47	46	46	39	7	9	9	8	10	10	7	9	2	0	0	0	-1	-1	-8	-7	-2	3	-7	-2	4	-7	-2	-4	Moderate
278062	6209875		1	49	42	35	55	45	40	36	36	36	36	36	36	34	34	29	-13	-6	1	-13	-6	1	-15	-8	-6	0	0	0	-2	-2	-7	-22	-12	-7	-22	-12	-7	-24	-14	-14	None
278070	6208626		6	39	37	37	50	45	40	44	44	44	45	45	45	44	44	37	5	7	7	6	8	8	5	7	0	0	0	0	-1	-1	-7	-9	-4	1	-8	-3	2	-9	-4	-6	Moderate
278080	6209830		2	44	42	35	55	45	40	38	38	38	37	37	37	36	36	31	-6	-4	3	-7	-5	2	-8	-6	-4	0	0	0	-1	-1	-6	-20	-10	-5	-21	-11	-6	-22	-12	-12	None
278085	6204119		4	35	35	35	50	45	40	36	36	36	36	36	36	34	34	30	1	1	1	1	1	1	-1	-1	-5	0	0	0	-2	-2	-6	-17	-12	-7	-17	-12	-7	-19	-14	-13	None
278085	6208863		6	39	37	37	50	45	40	43	43	43	43	43	43	42	42	36	4	6	6	4	6	6	3	5	-1	0	0	0	-1	-1	-6	-10	-5	0	-10	-5	0	-11	-6	-7	Marginal
278087	6209882		1	49	42	35	55	45	40	36	36	36	36	36	36	34	34	30	-13	-6	1	-13	-6	1	-15	-8	-5	0	0	0	-2	-2	-5	-22	-12	-7	-22	-12	-7	-24	-14	-13	None
278090	6209811		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	31	-6	-4	3	-6	-4	3	-7	-5	-4	0	0	0	-1	-1	-6	-20	-10	-5	-20	-10	-5	-21	-11	-12	None
278098	6209793		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	31	-6	-4	3	-6	-4	3	-7	-5	-4	0	0	0	-1	-1	-6	-20	-10	-5	-20	-10	-5	-21	-11	-12	None
278098	6209773		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	32	-6	-4	3	-6	-4	3	-7	-5	-4	0	0	0	-1	-1	-6	-20	-10	-5	-20	-10	-5	-21	-11	-12	None
278101	6209837		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	31	-7	-5	2	-7	-5	2	-8	-6	-4	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-22	-12	-12	None
278107	6209753		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	32	-6	-4	3	-6	-4	3	-7	-5	-3	0	0	0	-1	-1	-6	-20	-10	-5	-20	-10	-5	-21	-11	-11	None
278109	6209893		1	49	42	35	55	45	40	36	36	36	36	36	36	34	34	31	-13	-6	1	-13	-6	1	-15	-8	-4	0	0	0	-2	-2	-5	-22	-12	-7	-22	-12	-7	-24	-14	-12	None
278114	6209205		6	39	37	37	50	45	40	41	41	41	41	41	41	40	40	34	2	4	4	2	4	4	1	3	-3	0	0	0	-1	-1	-6	-12	-7	-2	-12	-7	-2	-13	-8	-9	Marginal
278115	6209799		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	31	-6	-4	3	-6	-4	3	-7	-5	-4	0	0	0	-1	-1	-6	-20	-10	-5	-20	-10	-5	-21	-11	-12	None
278115	6209734		2	44	42	35	55	45	40	38	38	38	38	38	38	37	37	32	-6	-4	3	-6	-4	3	-7	-5	-3	0	0	0	-1	-1	-6	-20	-10	-5	-20	-10	-5	-21	-11	-11	None
278117	6209717		5	37	35	35	50	45	40	38	38	38	38	38	38	37	37	32	1	3	3	1	3	3	0	2	-3	0	0	0	-1	-1	-6	-15	-10	-5	-15	-10	-5	-16	-11	-11	Negligible
278124	6209902		2	44	42	35	55	45	40	37	37	37	37	37	37	35	35	31	-7	-5	2	-7	-5	2	-9	-7	-4	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-23	-13	-12	None
278129	6209696		5	37	35	35	50	45	40	38	38	38	38	38	38	37	37	32	1	3	3	1	3	3	0	2	-3	0	0	0	-1	-1	-6	-15	-10	-5	-15	-10	-5	-16	-11	-11	Negligible

				PSNL (Intrusive)			Amenity			Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
										Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
278131	6209680		5	37	35	35	50	45	40	38	38	38	39	39	39	37	37	32	1	3	3	2	4	4	0	2	-3	0	0	0	-1	-1	-6	-15	-10	-5	-14	-9	-4	-16	-11	-11	Negligible
278144	6209663		5	37	35	35	50	45	40	38	38	38	39	39	39	37	37	32	1	3	3	2	4	4	0	2	-3	0	0	0	-1	-1	-6	-15	-10	-5	-14	-9	-4	-16	-11	-11	Negligible
278145	6204022		4	35	35	35	50	45	40	36	36	36	36	36	36	33	33	29	1	1	1	1	1	1	-2	-2	-6	0	0	0	-2	-2	-6	-17	-12	-7	-17	-12	-7	-20	-15	-14	None
278151	6209937		2	44	42	35	55	45	40	37	37	37	37	37	37	35	35	30	-7	-5	2	-7	-5	2	-9	-7	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-23	-13	-13	None
278153	6209625		5	37	35	35	50	45	40	39	39	39	39	39	39	38	38	32	2	4	4	2	4	4	1	3	-3	0	0	0	-1	-1	-6	-15	-10	-5	-14	-9	-4	-15	-10	-11	Marginal
278162	6209973		1	49	42	35	55	45	40	37	37	37	37	37	37	35	35	30	-12	-5	2	-12	-5	2	-14	-7	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-23	-13	-13	None
278166	6208380		6	39	37	37	50	45	40	46	46	46	46	46	46	45	45	38	7	9	9	7	9	9	6	8	1	0	0	0	-1	-1	-8	-7	-2	3	-7	-2	3	-8	-3	-5	Moderate
278174	6209939		2	44	42	35	55	45	40	37	37	37	37	37	37	35	35	30	-7	-5	2	-7	-5	2	-9	-7	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-23	-13	-13	None
278174	6209991		1	49	42	35	55	45	40	36	36	36	36	36	36	35	35	30	-13	-6	1	-13	-6	1	-14	-7	-5	0	0	0	-1	-1	-6	-22	-12	-7	-22	-12	-7	-23	-13	-13	None
278176	6209576		5	37	35	35	50	45	40	39	39	39	39	39	39	38	38	32	2	4	4	2	4	4	1	3	-3	0	0	0	-1	-1	-6	-14	-9	-4	-14	-9	-4	-15	-10	-11	Marginal
278182	6205888	185 Charlies Point Road, Bargo	4	35	35	35	50	45	40	45	45	45	48	48	48	48	48	40	10	10	10	13	13	13	13	13	5	3	3	3	2	2	-6	-8	-3	2	-5	0	5	-5	0	-3	Moderate
278185	6209945		2	44	42	35	55	45	40	37	37	37	37	37	37	35	35	30	-7	-5	2	-7	-5	2	-9	-7	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-23	-13	-13	None
278196	6209954		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	31	-7	-5	2	-7	-5	2	-8	-6	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
278203	6204085		4	35	35	35	50	45	40	36	36	36	37	37	37	35	35	29	1	1	1	2	2	2	0	0	-6	1	1	1	-1	-1	-6	-17	-12	-7	-16	-11	-6	-18	-13	-14	None
278208	6209960		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-7	-5	2	-7	-5	2	-8	-6	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
278230	6209116		5	37	35	35	50	45	40	39	39	39	39	39	39	37	37	34	2	4	4	2	4	4	0	2	-1	0	0	0	-2	-2	-5	-14	-9	-4	-14	-9	-4	-16	-11	-9	Negligible
278233	6209974		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-7	-5	2	-7	-5	2	-8	-6	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
278239	6209988		2	44	42	35	55	45	40	37	37	37	37	37	37	36	36	30	-7	-5	2	-7	-5	2	-8	-6	-5	0	0	0	-1	-1	-6	-21	-11	-6	-21	-11	-6	-22	-12	-13	None
278254	6209374		5	37	35	35	50	45	40	39	39	39	39	39	39	38	38	33	2	4	4	2	4	4	1	3	-2	0	0	0	-1	-1	-6	-14	-9	-4	-14	-9	-4	-15	-10	-10	Marginal
278269	6208288		6	39	37	37	50	45	40	46	46	46	45	45	45	44	44	38	7	9	9	6	8	8	5	7	1	0	0	0	-1	-1	-7	-7	-2	3	-8	-3	2	-9	-4	-5	Moderate
278280	6206112	215 Charlies Point Rd, Bargo	4	35	35	35	50	45	40	47	47	47	50	50	50	50	50	39	12	12	12	15	15	15	15	15	4	3	3	3	3	3	-8	-6	-1	4	-3	2	7	-3	2	-4	Significant
278287	6208946		5	37	35	35	50	45	40	41	41	41	42	42	42	41	41	35	4	6	6	5	7	7	4	6	0	0	0	0	-1	-1	-7	-12	-7	-2	-11	-6	-1	-12	-7	-8	Moderate
278294	6209306		5	37	35	35	50	45	40	39	39	39	39	39	39	38	38	33	2	4	4	2	4	4	1	3	-2	0	0	0	-1	-1	-6	-14	-9	-4	-14	-9	-4	-15	-10	-10	Marginal
278296	6209044		5	37	35	35	50	45	40	41	41	41	41	41	41	40	40	34	4	6	6	4	6	6	3	5	-1	0	0	0	-1	-1	-6	-12	-7	-2	-12	-7	-2	-13	-8	-9	Marginal
278348	6208866		5	37	35	35	50	45	40	42	42	42	42	42	42	41	41	35	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-12	-7	-8	Moderate
278348	6208730		5	37	35	35	50	45	40	43	43	43	43	43	43	42	42	36	6	8	8	6	8	8	5	7	1	0	0	0	-1	-1	-7	-10	-5	0	-10	-5	0	-11	-6	-7	Moderate
278377	6208334		5	37	35	35	50	45	40	45	45	45	45	45	45	43	43	37	8	10	10	8	10	10	6	8	2	0	0	0	-1	-1	-7	-8	-3	2	-8	-3	2	-10	-5	-6	Moderate
278383	6208506		5	37	35	35	50	45	40	44	44	44	44	44	44	43	43	37	7	9	9	7	9	9	6	8	2	0	0	0	-1	-1	-7	-9	-4	1	-9	-4	1	-10	-5	-6	Moderate
278400	6208685		5	37	35	35	50	45	40	43	43	43	43	43	43	42	42	36	6	8	8	6	8	8	5	7	1	0	0	0	-1	-1	-7	-10	-5	0	-10	-5	0	-11	-6	-7	Moderate
278400	6209195		5	37	35	35	50	45	40	37	37	37	37	37	37	36	36	31	0	2	2	0	2	2	-1	1	-4	0	0	0	-2	-2	-6	-16	-11	-6	-16	-11	-6	-17	-12	-12	Negligible
278422	6209106		5	37	35	35	50	45	40	37	37	37	37	37	37	36	36	31	0	2	2	0	2	2	-1	1	-4	0	0	0	-2	-2	-6	-16	-11	-6	-16	-11	-6	-17	-12	-12	Negligible
278440	6208475		5	37	35	35	50	45	40	44	44	44	44	44	44	42	42	36	7	9	9	7	9	9	5	7	1	0	0	0	-1	-1	-7	-9	-4	1	-9	-4	1	-11	-6	-7	Moderate
278467	6208913		5	37	35	35	50	45	40	41	41	41	41	41	41	39	39	34	4	6	6	4	6	6	2	4	-1	0	0	0	-1	-1	-7	-12	-7	-2	-12	-7	-2	-14	-9	-9	Marginal
278470	6208274		5	37	35	35	50	45	40	42	42	42	42	42	42	40	40	35	5	7	7	5	7	7	3	5	0	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-13	-8	-8	Marginal
278481	6208763		5	37	35	35	50	45	40	42	42	42	42	42	42	41	41	35	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-12	-7	-8	Moderate
278525	6209243		5	37	35	35	50	45	40	37	37	37	36	36	36	35	35	30	-1	2	2	-1	1	1	-2	0	-5	0	0	0	-2	-2	-6	-17	-12	-7	-17	-12	-7	-18	-13	-13	None
278573	6208183		5	37	35	35	50	45	40	42	42	42	42	42	42	41	41	35	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-12	-7	-8	Moderate
278596	6209271		5	37	35	35	50	45	40	36	36	36	36	36	36	35	35	30	-1	1	1	-1	1	1	-2	0	-5	0	0	0	-2	-2	-6	-17	-12	-7	-17	-12	-7	-18	-13	-13	None
278651	6208864		5	37	35	35	50	45	40	41	41	41	41	41	41	40	40	34	4	6	6	4	6	6	3	5	-1	0	0	0	-1	-1	-7	-12	-7	-2	-12	-7	-2	-13	-8	-9	Marginal
278663	6208711	M7 - eastern end of Hodgson Grove	5	37	35	35	50	45	40	42	42	42	42	42	42	40	40	34	5	7	7	5	7	7	3	5	-1	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-13	-8	-9	Marginal
278673	6208503		5	37	35	35	50	45	40	42	42	42	42	42	42	41	41	35	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-12	-7	-8	Moderate
278720	6208341		5	37	35	35	50	45	40	43	43	43	43	43	43	42	42	36	6	8	8	6	8	8	5	7	1	0	0	0	-1	-1	-7	-10	-5	0	-10	-5	0	-11	-6	-7	Moderate
278780	6208318		5	37	35	35	50	45	40	43	43	43	43	43	43	42	42	36	6	8	8	6	8	8	5	7	1	0	0	0	-1	-1	-7	-10	-5	0	-10	-5	0	-11	-6	-7	Moderate
278809	6208573		5	37	35	35	50	45	40	41	41	41	41	41	41	40	40	35	4	6	6	4	6	6	3	5	0	0	0	0	-1	-1	-7	-12	-7	-2	-12	-7	-2	-13	-8	-8	Marginal
278853	6208399		5	37	35	35	50	45	40	42	42	42	42	42	42	41	41	35	5	7	7	5	7	7	4	6	0	0	0	0	-1	-1	-7	-11	-6	-1	-11	-6	-1	-12	-7	-8	Moderate
278874	6208640		5	37	35	35	50	45	40	41	41	41	41	41	41	39	39	34	4	6	6	4	6	6	2	4	-1	0	0	0	-2	-2	-7	-12	-7	-2	-12	-7	-2	-14	-9	-9	Marginal
278904	6208828		5	37	35	35	50	45	40	40	40	40	40	40	40	39	39	33	3	5	5	3	5	5	2	4	-2	0	0	0	-2	-2	-7	-13	-8	-3	-13	-8	-3	-14	-9	-10	Marginal
278914	6208214		5	37	35	35	50	45	40	43	43	43	43	43	43	41	41	35	6	8	8	6	8	8	4	6	0	0	0	0	-2	-2	-8	-10	-5	0	-10	-5	0	-12	-7	-8	Moderate
279043	6208273		5	37	35	35	50	45	40	42	42	42	42	42	42	40	40	34	5	7	7	5	7	7	3	5	-1	0	0	0	-2	-2	-8	-11	-6	-1	-11	-6	-1	-13	-8	-9	Marginal
279060	6208093		4	35	35	35	50	45	40	42	42	42	42	42	42	40	40	34	7	7	7	7	7	7	5	5	-1	-1	-1	-1	-3	-3	-8	-11	-6	-1	-11	-6	-1	-13	-8	-9	Marginal
279074	6207983		4	35	35	35	50	45	40	40	40	40	39	39	39	38	38	32	5	5	5	4	4	4	3	3	-3	-1	-1	-1	-2	-2	-8	-13	-8	-3	-14	-9	-4	-15	-10	-11	Marginal
279143	6205635		4	35	35	35	50	45	40	40	40	40	41	41	41	40	40	34	5	5	5	6	6	6	5	5	-1	1	1	1	0	0	-7	-13	-8	-3	-12	-7	-2	-13	-8	-9	Marginal
279156	6205332		4	35	35	35	50	45	40	39	39	39	40	40	40	39	39	33	4	4	4	5	5	5	4	4	-2	1	1	1	0	0	-6	-14	-9	-4	-13	-8	-3	-14	-9	-10	Marginal
279273	6207883	M8 - Rockford Rd, near existing vent fan	4	35	35	35	50	45	40	40	40	40	38	38	38	37	37	31	5	5	5	3	3	3	2	2	-4	-2	-2	-2	-3	-3	-9	-13	-8	-3	-15	-10	-5	-16	-11	-12	Negligible
279300	6205322		4	35	35	35	50	45	40	38	38	38	39	39	39	38	38	32	3	3	3	4	4	4	3	3	-3	1	1	1	0	0	-6	-15	-10	-5	-14	-9	-4	-15	-10	-11	Marginal
279392	6205771		4	35	35	35	50	45	40	40	40	40	41	41	41	40	40	33	5	5	5	6	6	6	5	5	-2	1	1	1	0	0	-7	-13	-8	-3	-12	-7	-2	-13	-8	-10	Marginal
279445	6205566		4	35	35	35	50	45	40	39	39	39	40	40	40	39	39	32	4	4	4	5	5	5	4	4	-3	1	1	1	0	0	-6	-14	-9	-4	-13	-8	-3	-14	-9	-11	Marginal
279511	6207887		4	35	35	35	50	45	40	39	39	39	37	37	37	36	36	30	4	4	4	2	2	2	1	1	-5	-2	-2	-2	-3	-3	-8	-14	-9	-4	-16	-11	-6	-17	-12	-13	Negligible
279520	6207710		4	35	35	35	50	45	40	38	38	38	37	37	37	37	37	30	3	3	3	2	2	2	2	2	-5	-1	-1	-1	-1	-1	-7	-15	-10	-5	-16	-11	-6	-16	-11	-13	Negligible
279534	6205803		4	35	35	35	50	45	40	39	39	39	40	40	40	39	39	32	4	4	4	5	5	5	4	4	-3	1	1	1	0	0	-7	-14	-9	-4	-13	-8	-3	-14	-9	-11	Marginal
279544	6205585		4	35	35	35	50	45	40	38	38	38	39	39	39	39	39	32	3	3	3	4	4	4	4	4	-3	1	1	1	0	0	-7	-15	-10	-5	-14	-9	-4	-14	-9	-11	Marginal
279586	6207924		4	35	35	35	50	45	40	38	38	38	36	36	36	35	35	30	3	3	3	1	1	1	0	0	-5	-2	-2	-2	-3	-3	-8	-15	-10	-5	-17	-12	-7	-18	-13	-13	None
279633	6205095		4	35	35	35	50	45	40	36	36	36	37	37	37	36	36	30	1	1	1	2	2	2	1	1	-5	1	1	1	0	0	-6	-17	-12	-7	-16	-11	-6	-17	-12	-13	Negligible
279647	6205708		4	35	35	35	50	45	40	38	38	38	39	39	39	38	38	32	3	3	3	4	4	4	3	3	-3	1	1	1	0	0	-7	-15	-10	-5	-14	-9	-4	-15	-10	-11	Marginal

										Predicted noise emissions - noise-enhancing									Comparison to PSNL									Comparison to existing						Comparison to amenity criteria									
				PSNL (Intrusive)			Amenity			Existing			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			TSP Unmit			TSP Mit			Existing			TSP Unmit			TSP Mit			
Easting	Northing	Location details	NCA	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N	Characterisation of impacts
279655	6207903		4	35	35	35	50	45	40	37	37	37	36	36	36	35	35	29	2	2	2	1	1	1	0	0	-6	-1	-1	-1	-2	-2	-8	-16	-11	-6	-17	-12	-7	-18	-13	-14	None
279709	6205359		4	35	35	35	50	45	40	37	37	37	38	38	38	37	37	31	2	2	2	3	3	3	2	2	-4	1	1	1	0	0	-6	-16	-11	-6	-15	-10	-5	-16	-11	-12	Negligible
279711	6207784	M9 - Kammer Pl	4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	29	1	1	1	1	1	1	0	0	-6	-1	-1	-1	-1	-1	-7	-17	-12	-7	-17	-12	-7	-18	-13	-14	None
279713	6204797		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	29	0	0	0	1	1	1	0	0	-6	1	1	1	0	0	-6	-18	-13	-8	-17	-12	-7	-18	-13	-14	None
279728	6207929		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	29	1	1	1	1	1	1	0	0	-6	-1	-1	-1	-2	-2	-7	-17	-12	-7	-17	-12	-7	-18	-13	-14	None
279788	6204923		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	30	0	0	0	1	1	1	0	0	-5	1	1	1	0	0	-6	-18	-13	-8	-17	-12	-7	-18	-13	-13	None
279792	6205445		4	35	35	35	50	45	40	37	37	37	38	38	38	37	37	31	2	2	2	3	3	3	2	2	-4	1	1	1	0	0	-6	-16	-11	-6	-15	-10	-5	-16	-11	-12	Negligible
279803	6207063		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	29	1	1	1	1	1	1	0	0	-6	0	0	0	-1	-1	-7	-17	-12	-7	-17	-12	-7	-18	-13	-14	None
279863	6207235		4	35	35	35	50	45	40	36	36	36	36	36	36	35	35	29	1	1	1	1	1	1	0	0	-6	-1	-1	-1	-1	-1	-7	-17	-12	-7	-17	-12	-7	-18	-13	-14	None
279877	6204813		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	29	0	0	0	1	1	1	0	0	-6	1	1	1	0	0	-6	-18	-13	-8	-17	-12	-7	-18	-13	-14	None
280155	6206098		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	28	0	0	0	1	1	1	0	0	-7	1	1	1	0	0	-7	-18	-13	-8	-17	-12	-7	-18	-13	-15	None
280290	6205555		4	35	35	35	50	45	40	35	35	35	36	36	36	35	35	29	0	0	0	1	1	1	0	0	-6	1	1	1	0	0	-6	-18	-13	-8	-17	-12	-7	-18	-13	-14	None

Appendix D

Noise contours (indicative only)



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\Emmsvr1\emm\Jobs\2018\H180165 - Tahmoor South NIA\GIS\02_Maps\NIA002_NoiseContoursExisting_20181121_04.mxd 21/11/2018

KEY

- Assessment location
- Tahmoor-owned land

Existing noise contours (dB, $L_{Aeq(15\text{-}min)}$)

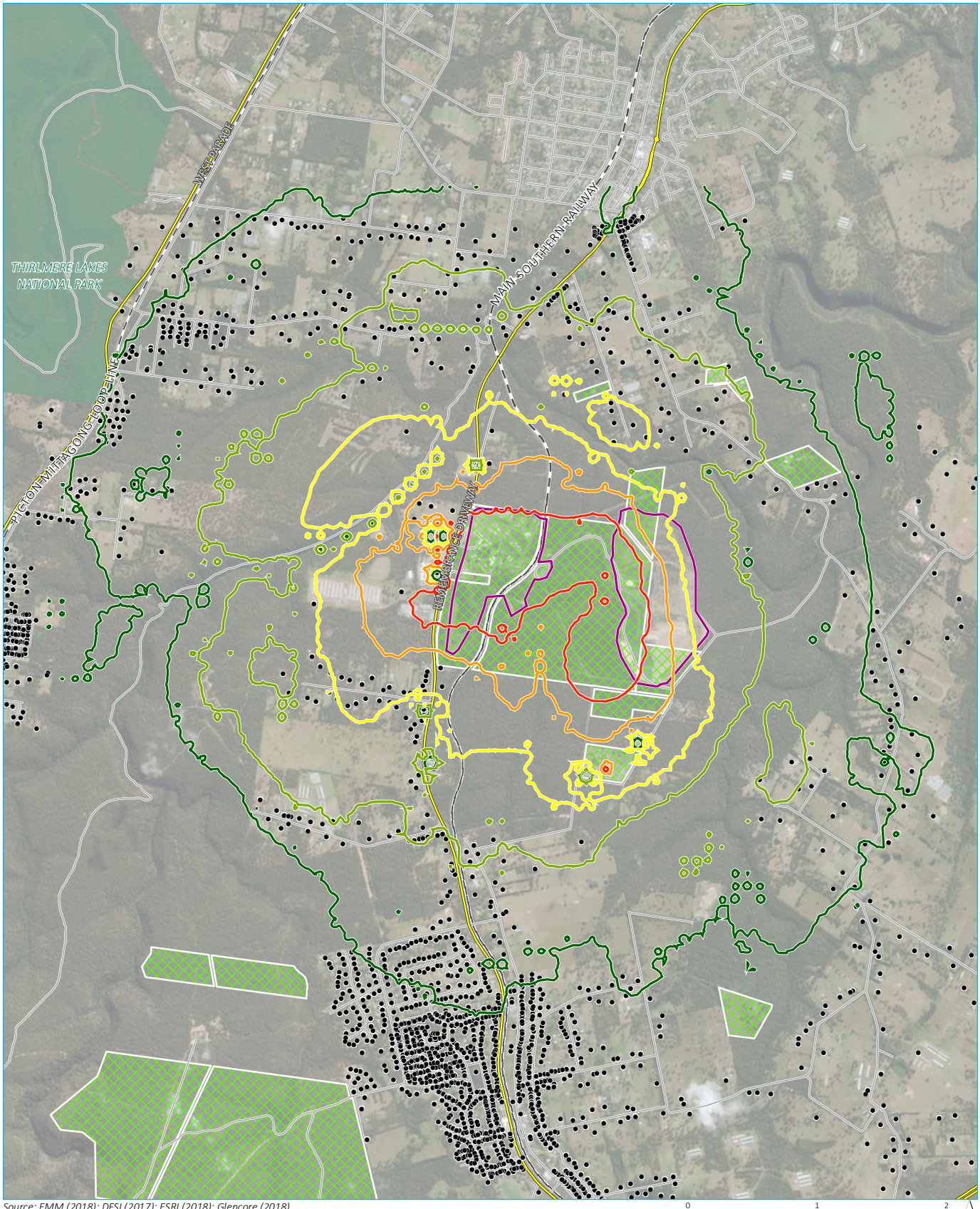
- 35
- 40
- 45
- 50
- 55

- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

Existing noise contours, noise enhancing (indicative only)

Tahmoor South Project
Noise impact assessment
Figure D.1

EMM
creating opportunities



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\Emmsvr1\emm\Jobs\2018\H180165 - Tahmoor South NIA\GIS\02_Maps\NIA003_UnmitigatedTSP_20181121_03.mxd 21/11/2018

KEY

- Assessment location
- Tahmoor-owned land

TSP unmitigated noise contours (dB, $L_{Aeq(15\text{-}min)}$)

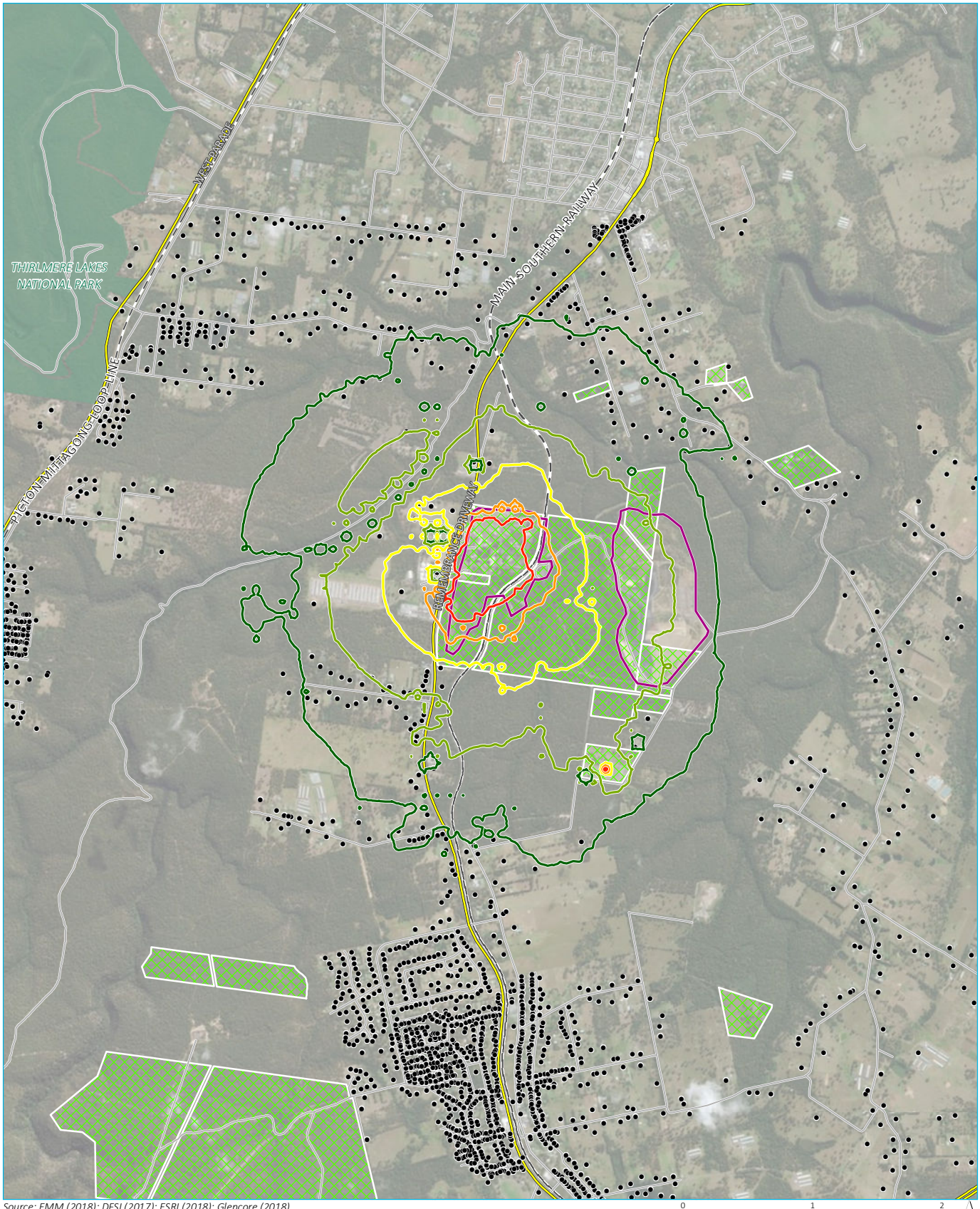
- 35
- 40
- 45
- 50
- 55

- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

TSP unmitigated, noise enhancing (indicative only)

Tahmoor South Project
Noise impact assessment
Figure D.2

EMM
creating opportunities



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

0 1 2 km

GDA 1994 MGA Zone 56

N

\\Emmsvr1\emm\Jobs\2018\H180165 - Tahmoor South NIA\GIS\02_Maps\NIA004_MitigatedTSP_20181121_03.mxd 21/11/2018

KEY

- Assessment location
- Tahmoor-owned land

TSP mitigated noise contours (dB, $L_{Aeq(15\text{-}min)}$)

- 35
- 40
- 45
- 50
- 55

- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

TSP mitigated, noise enhancing (indicative only)

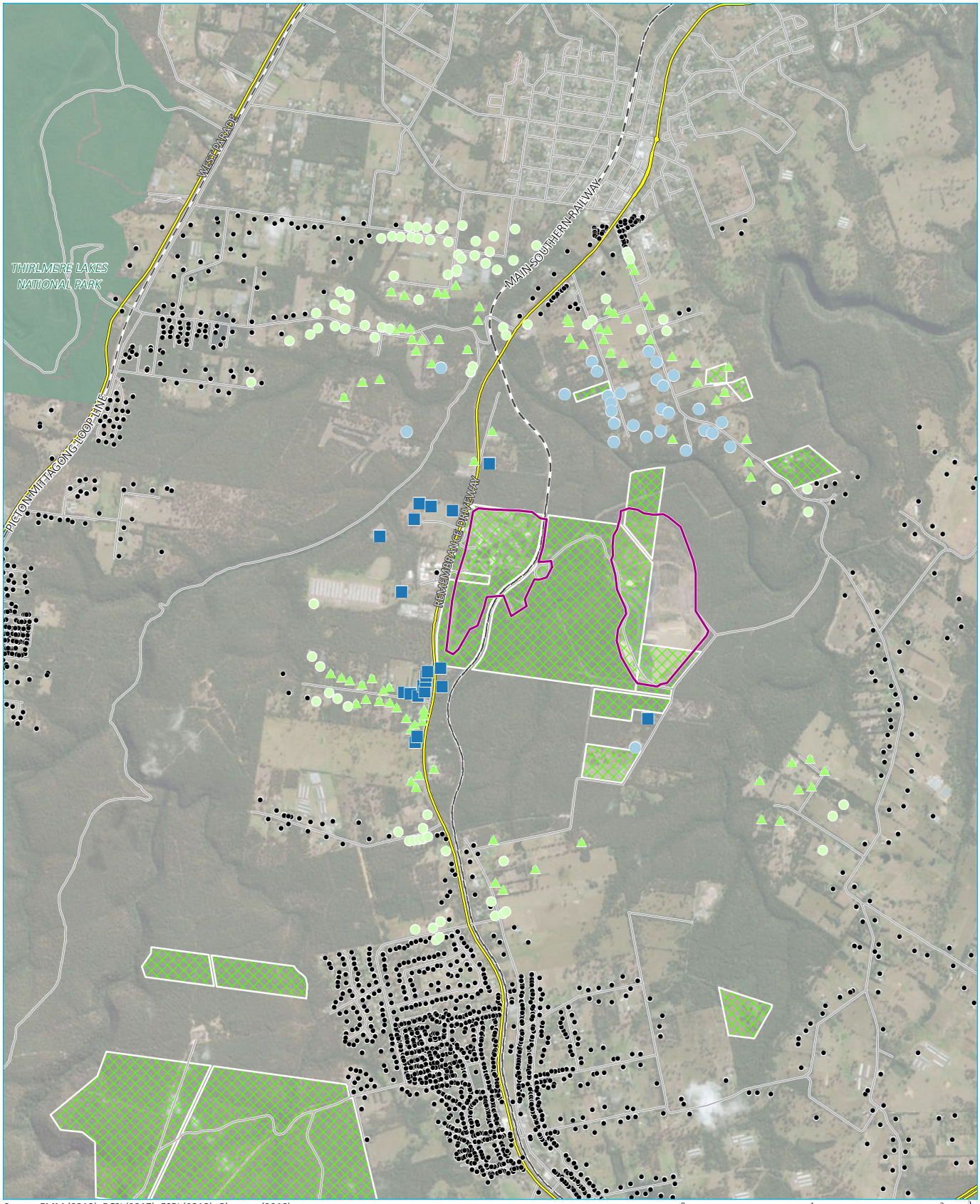
Tahmoor South Project
Noise impact assessment
Figure D.3

EMM
creating opportunities

Appendix E

VLAMP noise impact categories

.



Source: EMM (2018); DFSI (2017); ESRI (2018); Glencore (2018)

0 1 2 km

GDA 1994 MGA Zone 56

N

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KEY

Characterisation of impacts
- Negligible
- Marginal
- Moderate
- Significant
- Assessment location
- Tahmoor-owned land
- Mine site
- Rail line
- Main road
- Local road
- NPWS reserve

VLAMP noise impact categorisation

Tahmoor South Project
Noise impact assessment
Figure E.1

EMM creating opportunities

