Noise & Vibration Assessment for proposed Angora Feedlot Expansion

Prepared for:

AgDSA

Project:	Feedlot Expansion (cattle) ‘Angora’
Project Number:	20220044A
Location:	Rannock Burn Road, Rushes Creek, NSW
Client:	Planning & Environmental Compliance, AgDSA
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DOCUMENT CONTROL

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APPROVAL / SIGN OFF

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EXECUTIVE SUMMARY

Noise and vibration impacts from the proposed cattle feedlot expansion at '*Angora*' at Rannock Burn Road, Rushes Creek, NSW, postcode 2346, Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169, have been assessed in accordance with the specified NSW Planning Secretary's Environmental Assessment Requirements SEAR 1696 (EF22/7962).

The result of this assessment indicates the proposed cattle feedlot expansion at '*Angora*' at Rannock Burn Road, Rushes Creek, NSW can be constructed and operated without significant noise or vibration impacts on the surrounding noise and vibration sensitive receptors.

This assessment addresses the key noise and vibration issues as outlined in the NSW Planning Secretary's Environmental Assessment Requirements (SEAR) 1696, including:

- a description of all potential noise and vibration sources during construction and operation, including road traffic noise;
- a noise and vibration assessment in accordance with the relevant Environment Protection Authority (EPA) guidelines; and
- a description and appraisal of noise and vibration mitigation and monitoring measures.

This Environmental Assessment for noise and vibration for the proposed development, addresses the following requirements as outlined by the NSW Environment Protection Authority (EPA – DOC22/469304). The following points summarise the outcomes for the requirements listed in Attachment A, Section 4 regarding Noise and Vibration for the proposed expansion of the existing feedlot to accommodate 1,400 head of cattle and construction of a new feedlot to accommodate 9,500 head of cattle at 'Angora', Rannock Burn Road, Rushes Creek, NSW, in reference to SEAR 1696:

1. the construction noise associated with the proposed development conforms to the Interim Construction Noise Guideline (DECC, 2009), (ICNG);
2. the predicted vibration from all activities (including construction and operation) to be undertaken on the premises are in compliance with the guidelines contained in the 'Assessing Vibration: a technical guideline (DEC, 2006)';
3. no blasting is required for this project. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be assessed and demonstrated to be capable of complying with the guidelines contained in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990);
4. operational noise from all industrial activities (including private haul roads) to be undertaken on the premises conforms to the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017), (NPfI); and
5. noise on public roads from increased road traffic generated by land use developments conforms to the requirements of the guidelines contained in the NSW Road Noise Policy (RNP) and associated application notes (EPA, 2011).

This noise and vibration assessment has determined the noise criteria (project noise trigger levels) for the site as defined by the NPfI.

This noise assessment indicates the site is predicted to comply with the project noise criteria for both construction and operation activity. This Noise Assessment concludes that noise mitigation is not required for compliance with the project noise trigger levels for both construction and operation activity for the proposed cattle feedlot expansion at '*Angora*' at Rannock Burn Road, Rushes Creek, NSW.

In summary, the acoustic amenity of the area will not change significantly as a result of the proposed cattle feedlot expansion.

1 INTRODUCTION

Matrix Acoustics Pty Ltd was engaged by Agricultural Development Services Australia Pty Ltd (AgDSA), to assess noise and vibration impacts for the proposed cattle feedlot expansion at '*Angora*' (the Project) on Rannock Burn Road, Rushes Creek, NSW, postcode 2346 on Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169.

The 'Angora' property is situated approximately 40 kilometres North-West of Tamworth (approximately halfway between Tamworth and Gunnedah, NSW). The 'Angora' property operates an existing cattle feedlot for up to 1,000 head.

Figure 1-1 shows the general location of the 'Angora' property, which is situated approximately halfway between Tamworth and Gunnedah.

Figure 1-2 shows the existing 'Angora' property boundary in relation to the Peel River, Oxley highway, Rushes Creek Road and Rannock Burn Road. The figure indicates the location of the existing cattle feedlot.

The existing feedlot is proposed to expand to accommodate 1,400 head. In addition, it is proposed to construct a new cattle feedlot to accommodate 9,500 head. Therefore, the total proposed cattle feedlot operation could accommodate 10,900 head.

This noise and vibration assessment has been undertaken to determine the noise and vibration impacts for the proposed total cattle feedlot expansion of 10,900 head.

This noise and vibration assessment considers both the operation and construction of the new cattle feedlot facility for the total proposed expansion of the feedlot of 10,900 head.

The NSW Department of Planning and Environment provided the Planning Secretary's Environmental Assessment Requirements (SEAR) 1696 with document reference number EF22/7962. This document provides the requirements the for preparation of an Environmental Impact Statement (EIS) for the Project development proposal.

The SEAR 1696 states that the proposal is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires an approval under the Protection of the Environment Operations Act 1997.

This noise and vibration assessment objectives are:

- to determine the predicted noise and vibration impacts on sensitive receptors located near to the Project for both construction and operational phases;
- to determine the levels of mitigation likely to be required, if applicable, to enable compliance with the NSW Planning Secretary's Environmental Assessment Requirements; and
- to provide relevant noise and vibration information for the preparation of an Environmental Impact Statement (EIS) for the Project development proposal.

This noise and vibration assessment addresses the environmental operational noise impact of the proposed project in accordance with the NPfI.

This noise and vibration assessment addresses the environmental construction noise impact for two noise intensive construction scenarios in accordance with the ICNG.

This noise and vibration assessment addresses the environmental operational and construction vibration impact of the proposed project in accordance with the NSW Assessing Vibration: a technical guideline (DEC, 2006).

The project legislative context is further discussed in section 2 of this report.

Figure 1-1 Angora property located in Rushes Creek, NSW

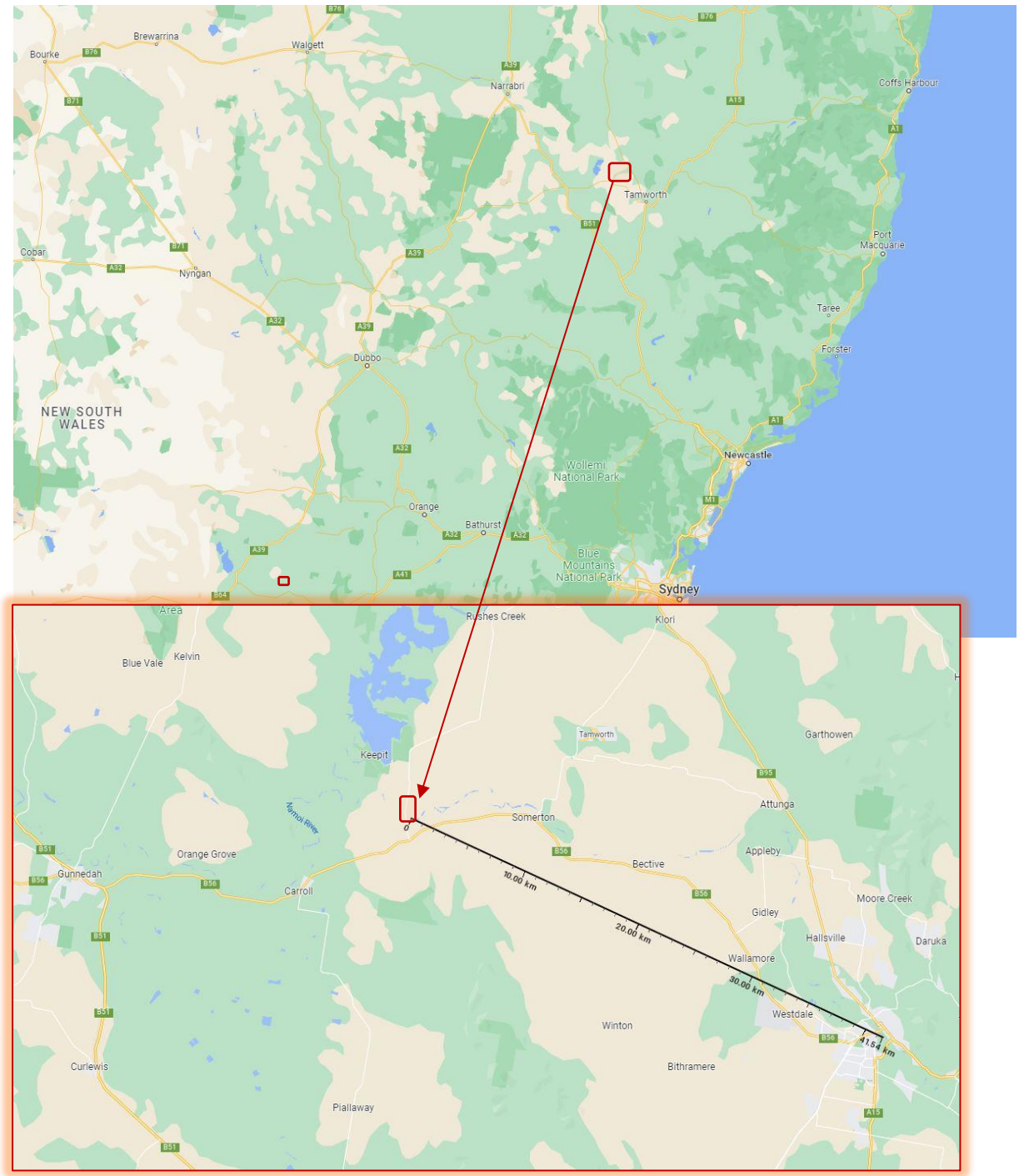
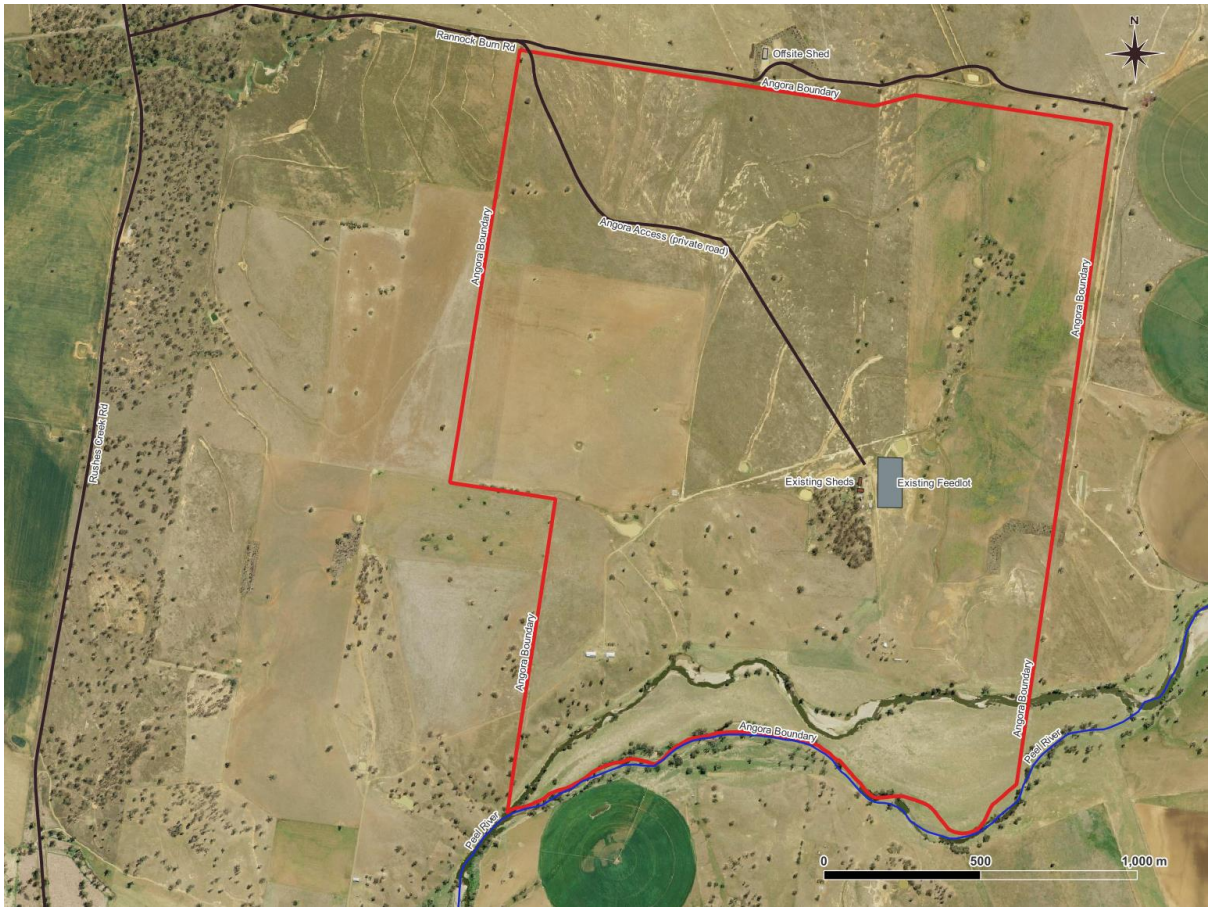


Figure 1-2 Angora property with existing cattle feedlot



2 PROJECT CRITERIA

2.1 OBJECTIVES AND PERFORMANCE OUTCOMES

Matrix Acoustics Pty Ltd was advised that the Project proposal is both designated and integrated development, under Part 4 of the Environmental Planning and Assessment Act 1979 and requires an approval under the Protection of the Environment Operations Act 1997.

The Project criteria are based on the NSW Department of Planning and Environment SEAR 1696 (EF22/7962) and the NSW Department of Urban Affairs and Planning: Cattle Feedlots - EIS Guideline. This report includes:

- a description of all potential noise and vibration sources during construction and operation, including road traffic noise;
- noise and vibration impact assessment in accordance with the relevant Environment Protection Authority (EPA) guidelines; and
- noise and vibration mitigation and management.

The NSW Department of Planning and Environment consulted with the EPA to prepare SEAR 1696. The EPA considered the details of the proposed Project (as supplied from the NSW Department of Planning and Environment) and issued requirements for general terms of approval in correspondence on 28th June, 2022 (Document reference: DOC22/469304). This document outlines the EPA's key information requirements for the proposed Project, which includes an adequate assessment of various environmental disciplines. This document specifies that potential noise and vibration impacts relating to the proposed development requires assessment regarding the proximity to sensitive receptors and the impact of any noise sources associated with the Project. Furthermore, relevant guidelines as listed in Attachment A of DOC22/469304, address specific issues for Nosie and Vibration.

Attachment A: Environmental Assessment Requirements – SEARS 1696 – Bottlejac Trading Company– Feedlot Expansion – 'Angora', Rannock Burn Road, Rushes Creek states:

> "*the Environmental Assessment (EA) must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).*"

Attachment A of the EPA DOC22/469304 also states the following:

> *"Impacts related to noise environmental issues need to be assessed, quantified and reported regarding the noise impacts associated with operational noise, particularly machinery and plant movements.*
>
> *The EA must assess the following noise and vibration aspects of the proposed development*
>
> *4.1. Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline*
>
> *4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the Assessing Vibration: a*

technical guideline (DEC, 2006). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990). These are available at: https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017). https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the NSW Road Noise Policy and associated application notes (EPA, 2011). https://www.epa.nsw.gov.au/your-environment/noise/transport-noise"

The NSW Department of Planning and Environment also consulted the NSW Department of Primary Industries (DPI) Agriculture regarding any additional requirements to inform the EIS for the proposed Project. NSW DPI Agriculture correspondence on 27th June, 2022 (document reference: OUT22/8859) indicated that industry guidelines and resource information listed in Attachment B of the correspondence, should also be consideration when preparing the EIS. The guidelines from Attachment B that relate to noise and vibration have been summarised in the following list:

I. Land Use Conflict Risk Assessment Guide: *https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/lucra*

II. Planning Guidelines, Intensive Livestock Agriculture Development: *https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/Primary-Production/planning-guidelines-intensive-livestock-agricultural-development-2019-02-28.pdf?la=en*

III. National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition: *https://www.feedlots.com.au/_files/ugd/f25d7a_e63ccd7008c34ccc94e4d278713d5abd.pdf*

IV. ALFA Industry Resources: *https://www.feedlots.com.au/resources*

V. Australian Animal Welfare Standards and Guidelines: *http://animalwelfarestandards.net.au/*

VI. National Beef Cattle Feedlot Environmental Code of Practice: *https://www.feedlots.com.au/_files/ugd/f25d7a_9f5490f89b894f4cb3d8fdcadd5f37e4.pdf*

2.2 SEAR Requirements

Each of the required items from the SEAR 1696 (EF22/7962) and EPA DOC22/469304 relating to noise and vibration emissions from the project, and where they are specifically addressed in this report are shown in Table 2-1.

Table 2-1 SEAR requirements in Report

SEAR Requirement	Description	Report section
Attachment A of EPA DOC22/469304 4.1	*Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009).*	*Section 3 to 7*
Attachment A of EPA DOC22/469304 4.2	*Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the Assessing Vibration: a technical guideline (DEC, 2006).*	*Section 3 to 6 and Section 9*
Attachment A of EPA DOC22/469304 4.3	*If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990).*	*Blasting is not required for this EIS*
Attachment A of EPA DOC22/469304 4.4	*Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017).*	*Section 3 to 8*
Attachment A of EPA DOC22/469304 4.5	*Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the NSW Road Noise Policy and associated application notes (EPA, 2011).*	*Section 8*
NSW Department of Urban Affairs and Planning	*Cattle Feedlots - EIS Guideline and refers to Environmental Noise Control Manual (EPA, 1994)*	Throughout
Land Use Conflict Risk Assessment Guide	Rural amenity regarding impact of noise from machinery on neighbours	Throughout
Planning Guidelines, Intensive Livestock Agriculture Development	Refers to NSW Noise Policy for Industry (EPA, 2017)	Throughout
National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	Section 2.7.3 Noise	Throughout
ALFA Industry Resources	Refers to National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	Throughout
Australian Animal Welfare Standards and Guidelines	Discusses design of yards in section G5.5	Throughout
National Beef Cattle Feedlot Environmental Code of Practice	Discusses recommendations for noise activity	Throughout

3 SENSITIVE RECEPTORS

The "Angora" site is identified as Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169 on Rannock Burn Road, Rushes Creek, NSW 2346.

It is understood that all land within the locality of the "Angora" property is used for agricultural purposes, varying from grazing and dryland farming and has therefore not been considered noise sensitive for the purposes of this assessment.

A sensitive receptor is a lawful and permanent structure erected in a land-use zone that permits residential use (or for which existing use rights under the EP&A Act apply) where a person/s permanently reside and is not, nor associated with, a commercial undertaking such as caretakers' quarters, hotel, motel, transient holiday accommodation or caravan park from which a development can be heard.

Four noise sensitive receptors have been identified as rural-residential dwellings situated around the "Angora" property. The location of these sensitive receptors ranges from the Eastern side to the South-Western side of the "Angora" property. Details of the project sensitive receptors are summarised in Table 3-1. Figure 3-1 shows the location of the project sensitive receptors.

The nearest receptor is nominated as receptor 4, and is located approximately two kilometres to the East of the proposed cattle feedlot expansion site.

Table 3-1 Project Sensitive Receptors

Receptor ID	Address	Distance from project (m)	Coordinates (MGA)	
			Easting	Northing
1	Rushes Creek Rd, Rushes Creek NSW 2346	2775	264880	6574818
2	Oxley Highway, Somerton NSW 2340	2400	267159	6574509
3	Oxley Highway, Somerton NSW 2340	2500	268112	6574711
4	Oxley Highway, Somerton NSW 2340	2000	268696	6576195
Caretaker[1]	*Rushes Creek Rd, Rushes Creek NSW 2346*	*1550*	*265757*	*6575694*

1. A caretaker dwelling is located on the "Angora" property and is not considered a sensitive receptor.

Sensitive receptors located on the Oxley Highway will experience an elevated background noise level due to existing road noise.

Figure 3-1 Location of Angora property in relation to nearby receptors

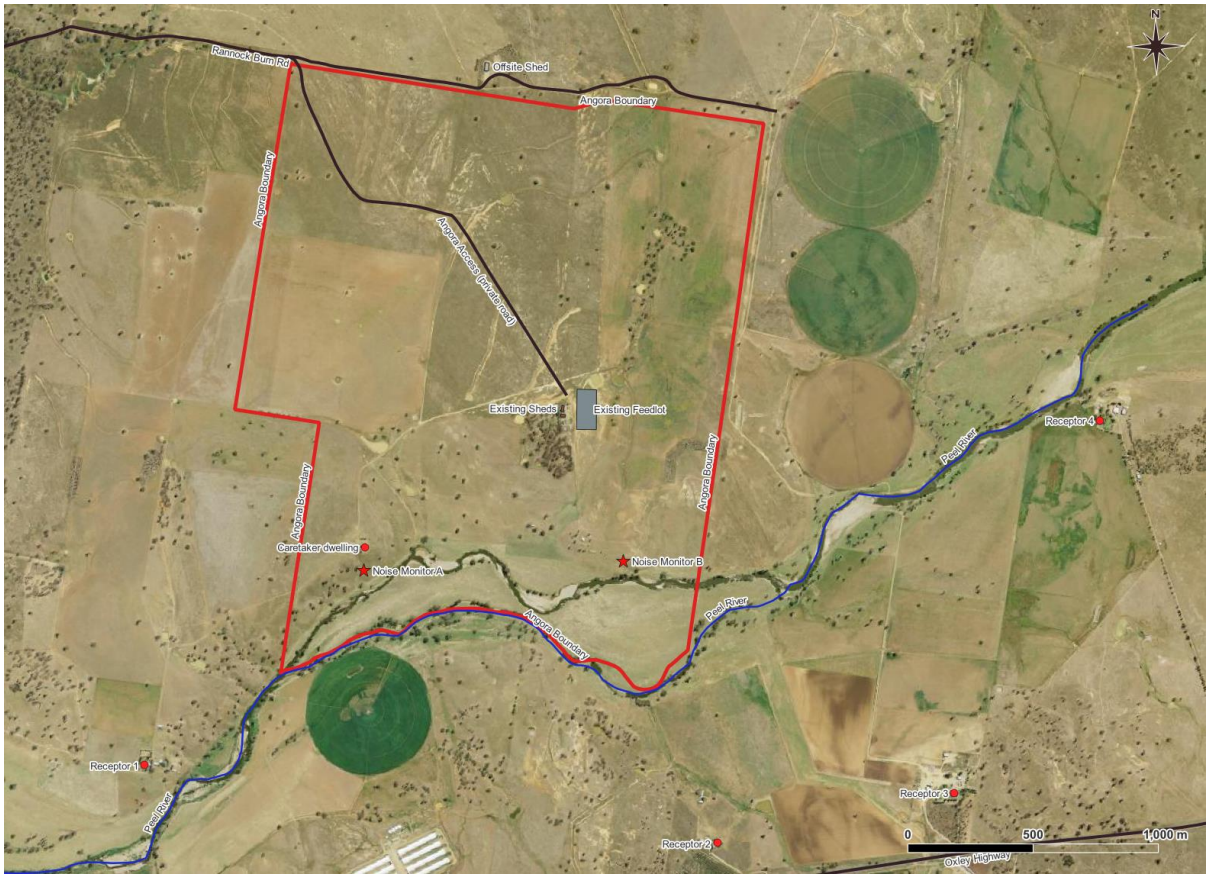


Figure 3-1 shows the Angora property in a Rural Landscape. The nearest receptor (nominated as Receptor 4) is located approximately two kilometres from the proposed cattle feedlot expansion site. The image also shows that all the nearest receptors are impacted by the Oxley Highway and other rural activity in the area. Figure 3-1 also shows the care-taker dwelling located on the Angora property and the two noise monitoring locations.

4 EXISTING NOISE ENVIRONMENT

4.1 AMBIENT NOISE MONITORING

Noise monitoring was conducted from Tuesday 15 November to Tuesday 29 November 2022 at two locations. Figure 3-1 shows the location of noise monitor A (located near the care taker dwelling) and noise monitor B (located at what is known as the "gravel pit"). It must be noted that no work was being conducted at the gravel pit during noise monitoring. Both noise monitors were located near the Peel River. Weather data for this noise monitoring period was obtained from a weather station which was located with noise monitor A.

Image 4-1 shows a picture of the noise monitor with weather station (indicated with red circle) with the Peel River shown in the background.

Image 4-1 Noise monitor A with weather station

Image 4-2 Noise monitor B, located at the "gravel pit" on the Angora property

Noise monitor A displayed significantly higher noise levels when compared with noise monitor B. It was noted that elevated sound pressure levels were experienced at noise monitor A due to the turbulent flow of the flooding Peel River.

Noise monitor B was used at a more conservative and representative data set for the background noise levels of this area. Table 4-1 presents a summary of the recorded noise levels for noise monitor B "gravel pit". Appendix A present the detailed noise records.

Attended noise monitoring at noise monitor B "gravel pit" was conducted on the 15th of November. The acoustic environment consisted of noise from the Peel River, bird noise, insect noise, Oxley Highway noise. Noise from the existing "Angora" cattle feedlot was not evident at noise monitoring location B. This location was considered representative of the existing rural acoustic environment.

Table 4-1 Summary of ambient noise records at the "gravel pit"

Date	Hourly L90 10th Percentile			Average Leq		
	Day	Evening	Night	Day	Evening	Night
15/11/2022	n/a[1]	47.4	43.5	n/a[1]	51.4	47.3
16/11/2022	41.2	41.4	39.8	46.3	45.0	43.2
17/11/2022	36.9	40.1	39.6	42.8	45.7	43.8
18/11/2022	34.6	42.1	38.6	41.7	50.4	47.5
19/11/2022	33.3	41.7	44.5	41.7	52.3	52.4
20/11/2022	38.5	39.4	37.6	44.8	47.5	43.8
21/11/2022	35.3	38.0	36.7	45.9	44.0	40.7
22/11/2022	35.8	38.4	35.7	42.4	42.0	40.1
23/11/2022	33.7	38.4	36.5	41.8	46.0	44.4
24/11/2022	32.7	40.0	38.0	43.5	50.0	47.3
25/11/2022	32.2	39.2	37.0	40.1	48.5	46.6
26/11/2022	30.7	38.2	37.2	40.1	47.4	47.8
27/11/2022	31.4	39.6	35.3	42.4	48.8	46.9
28/11/2022	34.4	39.0	37.1	42.6	45.8	41.3

1. Incomplete data excluded due to set-up or pack-up of noise monitor

5 PROJECT CRITERIA

5.1 NOISE CRITERIA

The NPfI provides guidance on the assessment of operational noise impacts and the determination of noise criteria (the project noise trigger level) for a proposed development.

5.1.1 Operational Noise Criteria

The NPfI provides suitable criteria for sensitive receptors and details methodologies for the assessment and management of operational noise emissions from industrial premises within NSW.

Within the NPfI, noise emissions are considered in various assessment periods defined as the day, evening, and night to reflect the sensitivity associated with the impacts of the noise.

The assessment periods defined by the EPA are included within Table 5-1.

Table 5-1 EPA Defined Assessment Periods

EPA Assessment Period	Relevant Days	Relevant Time Periods
Day	Monday to Saturday	7:00am to 6:00pm
	Sunday	8:00am to 6:00pm
Evening	All Days	6:00pm to 10:00pm
Night	Monday to Saturday	10:00pm to 7:00am
	Sunday	10:00pm to 8:00am

When addressing noise emissions associated with the commercial / industrial uses, the NPfI defines project trigger levels which are used to consider potential impacts at sensitive receptors.

The levels are determined based on consideration of what the NPfI refers to as the 'Project Intrusiveness Noise Level', and the 'Project Amenity Noise Levels'. The project trigger levels then adopt the lower and more stringent of the determined values.

For sensitive receptors, the trigger levels are assessed at the most affected point within site boundaries, or within 30 metres of dwellings where the dwellings are setback from boundaries.

5.1.1.1 Project Noise Trigger

The project noise trigger level is the lower value of the intrusiveness noise level and the amenity noise level. The intrusiveness noise aims to protect against significant changes in noise levels and the amenity noise level aims to protect against cumulative noise impacts from proposed and existing industry. It should be noted that a Project noise trigger level is not a noise limit, rather where it is determined that a project noise trigger level is exceeded all feasible and reasonable noise mitigation measures should be investigated with the goal of achieving the project noise trigger level.

5.1.1.2 Project intrusiveness noise level

The intrusiveness of a noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed

the rating background noise level (RBL) by more than 5 dB when beyond a minimum threshold. Table 5-2 presents the minimum RBL thresholds in relation to a development as outlined in the NPfI as well as the measured RBL.

Table 5-2 Minimum threshold and measured RBLs

Time of day	Minimum RBL threshold noise levels, dBA	Measured RBL, dBA
Day	**35**	34
Evening	30	**40**
Night	30	**37**

Table 5-3 presents the derived RBLs and the project intrusiveness noise levels. It should be noted that the intrusiveness noise levels are only applicable to residential receptors.

Table 5-3 Project RBLs and project intrusiveness noise levels

Time of day	Project RBLs in the area around the proposed development, dBA	Project intrusiveness noise levels ($L_{Aeq,15min}$ dBA)
Day	35	40 (35 + 5)
Evening	40	45 (40 + 5)
Night	37	42 (37 + 5)

5.1.1.3 Project amenity noise level

The recommended amenity noise level is the noise level target for total industrial noise at a receptor and is determined based on the existing acoustic environment, the receptor type and existing industrial activities in the area of the proposed development.

The project amenity noise level represents the noise level target for noise from a single development. It aims to limit the cumulative noise impacts from other industries and developments on all types of receptors. The project amenity noise level is determined by a 5 dBA subtraction from the recommended amenity noise level for receptors that are not impacted by more than four individual industrial noise sources.

The project amenity noise level may be modified in the following cases:

- developments in areas of high traffic noise levels;
- developments located near or inside an existing industrial cluster;
- where the project amenity noise level is at least 10 dBA lower than the existing industrial noise level; and
- where there are no other existing or proposed industries within the development area.

Table 5-4 outlines the recommended amenity noise levels for various receptor types as defined in the NPfI.

Table 5-4 NPfI amenity noise levels

Type of Receiver	Noise amenity area	Time of day	Recommended amenity noise level - L_{Aeq}, dB(A)
Residential	Rural	Day	50
		Evening	45
		Night	40

5.1.1.4 Maximum noise level events

The NPfI recommends a maximum noise level assessment to assess the potential for impact on sleep, hence noise disturbance that can cause awakening. An initial screening test for the maximum noise levels events should be assessed to the following levels.

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

If the screening test indicates there is a potential for sleep disturbance, then a detailed maximum noise level assessment should be undertaken. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

5.1.2 Construction Noise Criteria

Construction noise has been identified as a major environmental issue within NSW. Noise sources associated with demolition, remediation, renewal, and maintenance can generate high noise levels and have the potential to impact adversely on the surrounding acoustic environment including sensitive receptor locations.

Construction noise associated with the proposed development at “Angora” requires assessment in accordance to the ICNG.

The ICNG provides methodologies of assessing and managing the potential impacts of construction noise on residences and other sensitive land uses.

The main objectives of the ICNG are to:

- identify and minimise noise from construction works.;
- apply ‘feasible’ and ‘reasonable’ work practices to minimise construction noise impacts;
- encourage construction to be undertaken only during the ‘recommended standard hours’; unless approval is given for works that cannot be undertaken during these hours; and
- streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage.

The Guideline presents two methodologies for assessing construction noise impacts expressed as either quantitative or qualitative and which vary based generally on the project duration.

For short duration projects (less than 3 weeks), the qualitative assessment procedures are deemed applicable, which require the proponent to consider the Guideline’s checklist of work practices to minimise noise and implement appropriate strategies.

For projects of longer duration, the quantitative assessment procedure is recommended which includes derivation of ‘noise management levels’ (NML) and noise predictions to consider the potential noise impacts at sensitive receptor locations.

The NMLs are determined based on an emergence of the construction noise impacts above the RBLs defined within the NPfI for the ‘recommended standard hours’ as shown Table 5-5.

This assessment will use the quantitative assessment method as outlined in ICNG.

5.1.2.1 Recommended standard hours

The recommended standard hours for construction work are shown in Table 5-5.

Table 5-5 Recommended standard hours for construction work

Work type	Recommended standard hours of work[1]
Normal construction	Monday to Friday 7 am to 6 pm
	Saturday 8 am to 1 pm
	No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm
	Saturday 9 am to 1 pm
	No blasting on Sundays or public holidays

1. The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours.

5.1.2.2 Quantitative Noise Assessment at receptors

Table 5-6 sets out management levels for noise at residences and how they are to be applied. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level.

In Table 5-6 the rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the Glossary (Section 11).

As a guide, the difference between the internal noise level and the external noise level is typically 10 dB with windows open for adequate ventilation.

Table 5-6 Noise at residences using quantitative assessment

Time of day	Management level $L_{Aeq\ (15\ min)}$[1]	How to apply
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 LAeq (15 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(A)	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: 1. 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 2. 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(A) above the noise affected level, the proponent should negotiate with the community.

1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

The NMLs are not mandatory limits, however where construction noise levels are predicted to exceed the NMLs, it is considered appropriate that the proponent implement feasible and reasonable work practices to minimise the potential impacts on noise sensitive receptors.

Guidance regarding what is considered feasible and reasonable is contained within the ICNG and generally relates to practical implementation and ongoing maintenance requirements associated with the proposed treatment.

Where appropriate, the ICNG also requires consideration of ground borne noise impacts at residential receptors as well as the potential for noise emissions to cause sleep disturbance at residential receptors during the night time periods.

This assessment will not consider ground-borne noise impacts given the large distance between the noise source and the closest sensitive receptor to the site.

The ICNG also includes guidance regarding potential construction noise impacts on other commercial and industrial premises located within proximity of the subject site. It's understood that all land within the locality of the subject site is used for agricultural purposes varying from grazing and dryland farming and has therefore not been considered noise sensitive for the purposes of this assessment.

Potential impacts at residential receptors have therefore been the focus of the construction noise assessment and are considered further in this report.

5.2 Vibration Criteria

The potential impact of vibration from all activities, including operation and construction, at the proposed expansion of the Angora cattle feedlot in NSW has been assessed using guidelines from Assessing Vibration – a technical guideline (DEC 2006).

Note: No blasting is required for the construction of the proposed Angora feedlot. A blasting assessment has not conducted.

5.2.1 Vibration Assessment Methodology

The 'Assessing Vibration: a technical guideline (FEB, 2006)' states that vibration prediction procedures used for predicting groundborne vibration can be based on a combination of measurement and the use of formulas derived from actual experience. Examples of such assessment procedures are included in documents such as the US Federal Transit Administration's Transit noise and vibration impact assessment (1995) and the Transport Research Laboratory's Groundborne vibration caused by mechanised construction works (Hiller & Crabb, 2000).

For long term exposure a more stringent criteria has been applied. Australian Standard AS2670.2 – *Evaluation of human exposure to whole-body vibration Part 2: Continuous and shock induced vibration in buildings (1-80Hz)* presents guidance with respect to the annoyance (nuisance) of human beings subject to building vibration. The information is given for the three orthogonal axes with X being forwards and backwards, Y being left and right, and Z being foot to head. Table 5-7 presents the most stringent vibration criteria from AS2670.2. It is noted that these values are typically the threshold at which it is unlikely that any occupant would experience annoyance.

Table 5-7 Human comfort long term vibration limits to minimise annoyance

Axis	Root mean Square (RMS) Velocity (mm/s)
X	0.18
Y	0.18
Z	0.1

6 PROJECT SPECIFIC CRITERIA

6.1 PROJECT SPECIFIC OPERATIONAL NOISE CRITERIA

The conducted noise monitoring shows that the area has RBLs at or above the minimum assumed RBLs as outlined in the NPfI.

The area where the nearest noise sensitive receptors are located is considered rural. The subjective assessment of the acoustic environment in the area of the receptors is therefore consistent with the NSW planning portal description of a rural area.

Table 6-1 shows the amenity and intrusiveness project noise trigger levels as determined based on the derived existing ambient noise levels.

Table 6-1 Project intrusive noise and Project amenity noise levels

Time of day	Intrusive noise level (LAeq,15min dB[A])	Project amenity noise levels (LAeq,15min dB[A])
Day	40 (35 + 5)	48 (50 – 5 + 3)
Evening	45 (40 + 5)	43 (45 – 5 + 3)
Night	42 (37 + 5)	38 (40 – 5 + 3)

The project noise trigger level is the lower value of the intrusiveness and amenity noise levels. The project noise trigger levels are defined in Table 6-2.

Table 6-2 Project Noise Trigger levels

Time of day	Noise trigger levels
Day $L_{Aeq,15min}$	40
Evening $L_{Aeq,15min}$	43
Night $L_{Aeq,15min}$	38
Night L_{AFmax}	52

6.2 PROJECT SPECIFIC CONSTRUCTION NOISE CRITERIA

The conducted noise monitoring shows that the area has RBLs at or above the minimum assumed RBLs as outlined in the NPfI. Table 5-2 provides the measured RBLs associated with this project.

Table 6-3 provides the noise management levels for the proposed construction noise assessment. These levels are derived from Table 5-6, which outlines the construction noise criteria in accordance with the ICNG.

Table 6-3 Residential receptor Noise Management Level for Construction

Descriptor	NPfI Defined Assessment Period (LAeq,15min dB[A])		
	Day	Evening	Night
Recommended Standard Hours	45	N/A	N/A
Outside Recommended Standard Hours	40	45	42

6.3 PROJECT SPECIFIC VIBRATION CRITERIA

Refer section 5.2 for the vibration criteria applied to this project.

7 NOISE ASSESSMENTS

This report assesses both construction noise and operational noise associated with the proposed development. This includes sources from all industrial activities (including private haul roads) proposed to be undertaken on the premises as well as construction activities associated with the feedlot expansion. The construction noise assessment considers two construction scenarios:

- preliminary clearing and earthworks; and
- soil compaction and concrete works.

Noise levels were predicted using the SoundPlan noise modelling software and the CONCAWE noise propagation model. Features which affect the predicted noise level that are considered in the noise modelling include:

- equipment sound power levels and locations;
- screening from structures;
- receiver locations;
- ground topography;
- noise attenuation due to geometric spreading;
- ground absorption; and
- atmospheric absorption.

The model was populated with 3-D topography of the project and surrounding area, extending past the nearest assessment locations. Noise modelling representing the worst-case noise levels has been adopted for the assessment location.

7.1 NOISE MODEL INPUTS AND ASSUMPTIONS

Table 7-1 presents the inputs and assumptions that were used for the noise model.

Table 7-1 Noise model inputs and assumptions

Modelling element	Input / assumption. Source reference
Ground elevation geometry	Elevation data: • ELVIS - Elevation and Depth - Foundation Spatial Data
Ground absorption	100% over soft ground
Methodology	CONCAWE
Weather conditions	Daytime/evening: Stability categories D with 3 m/s winds Night-time: Stability category F with 2 m/s winds
Humidity	Daytime/evening: Humidity 60%, Temperature 20 °C Night-time: Humidity 90%, Temperature 10 °C
Wind direction	From noise source to receptor
Receiver height	1.5 m above ground (30m from residential building)

7.1.1 Operational Noise assessment

Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises using the guidelines contained in the NPfI.

7.1.1.1 Operational Noise sources

Operational noise sources were provided by AgDSA in drawings BTC-001 A401-A408 and operational plant items detailed in correspondence on 23 August 2023.

Operational noise includes cattle handling facilities, tractors, loaders, light vehicles, delivery of feedstock, clearing cattle pens, machinery workshop and a feed mill. The feed mill includes steeped grain elevators, flaked grain elevators, silo augers, wetting augers, weighing and transferring augers, along with associated conveyors and pneumatic valves, main cyclone fan and two 30kW R&R flaking mills.

Table 7-2 details the noise sources included in the noise model including the sound power level (SWL) for the operational phase of the fully expanded feedlot. Noise levels in the table have been obtained from similar projects and are assumed to be applicable to this project.

Figure 7-1 shows the location of noise sources modelled for the operation of the proposed cattle feedlot expansion. Figure 7-2 indicates the full operational areas of the proposed cattle feedlot for the Angora property including effluent disposal areas.

Table 7-2 Sound power levels for Operation

OPERATION	Equipment	SWL dBA	Operational Periods[1]
Machinery Workshop	Equipment in Machinery Workshop	85	Day
Feedlot expansion pens	Tractor clearing pens x2	107	Day
Loading at Handling Facility	Forklift	106	Day
	Front end loader	113	
Feed Mill - including: **< 1kW Motors x4** **1kW - 5 kW motors x11** **5kW - 10kW motors x2** **30kW motors x2**	Screw conveyors x9	71	Day, Evening, Night
	Compressor	83	
	Bucket elevator x2	75	
	Cyclone dust separator	72	
	Flaking mill	84	
	Pneumatic valves	85	
Heavy truck movements[2]	Trucks (x2)	62	Day

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. See section 7.1.1.2 for detailed explanation.

Figure 7-1 Noise source locations for the proposed Angora feedlot expansion

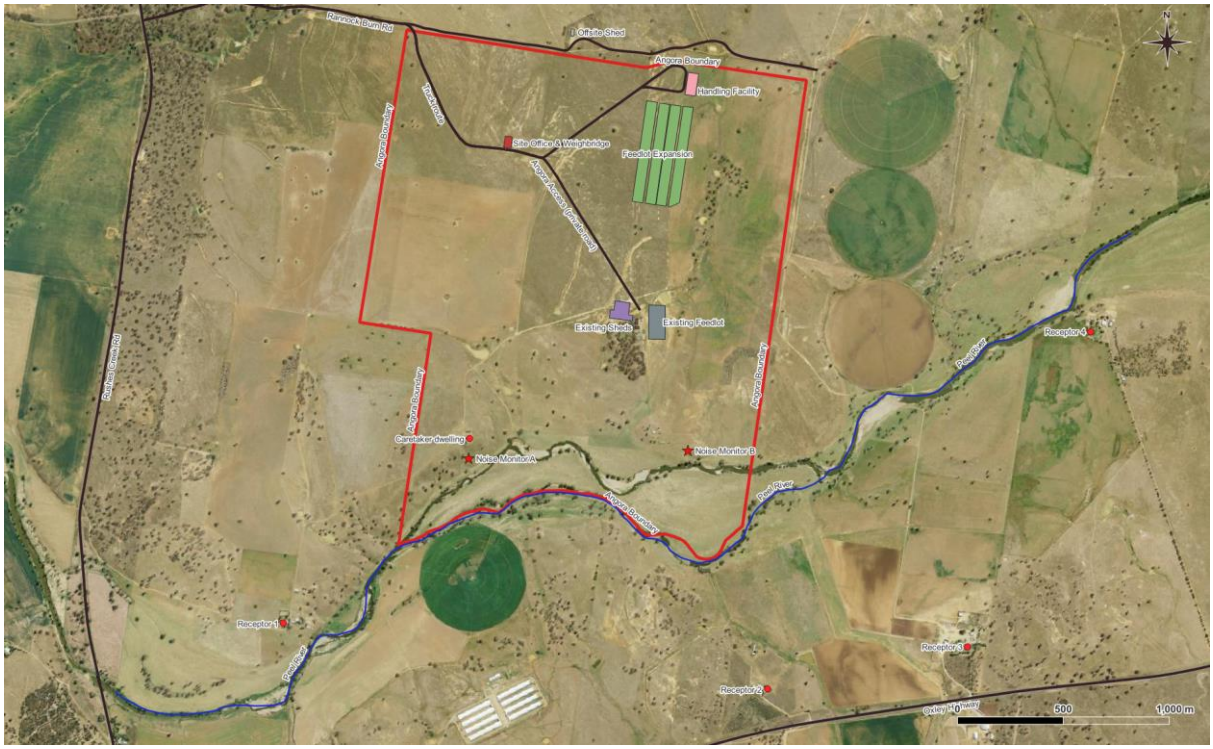
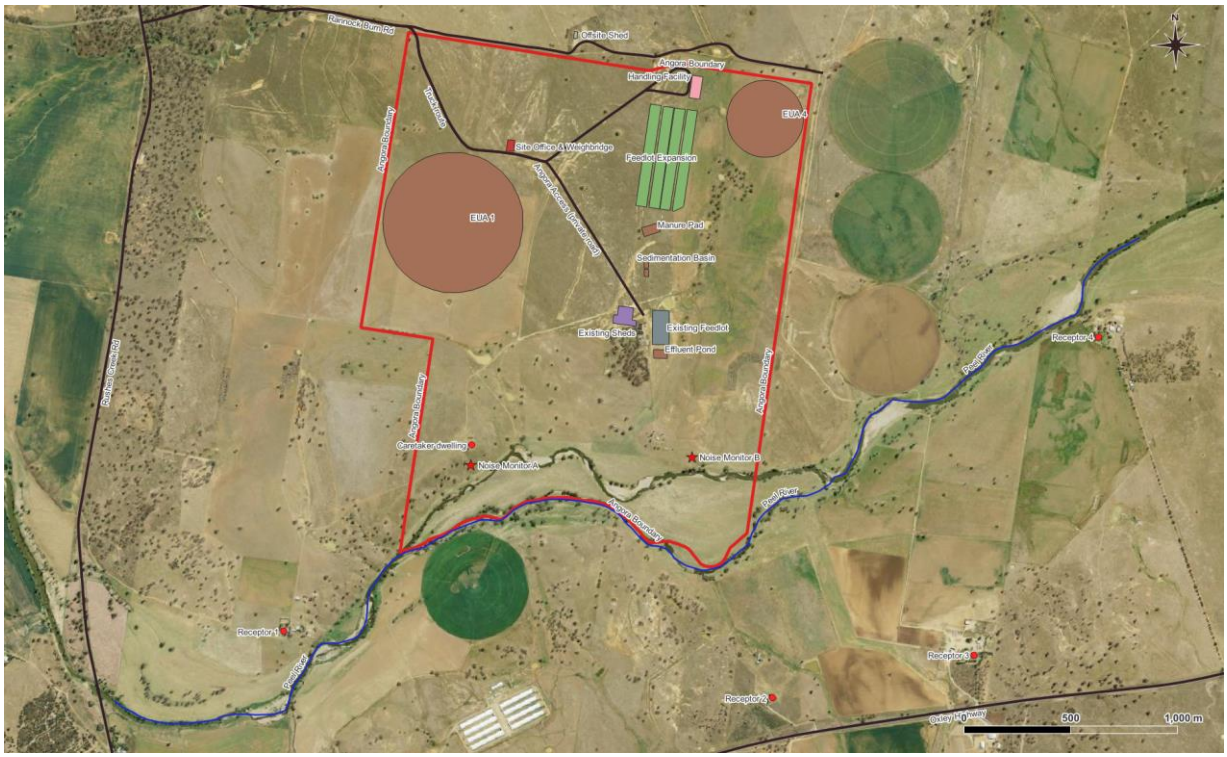


Figure 7-2 Total proposed development of Angora cattle feedlot



7.1.1.2 Heavy Vehicle Movements for Operational Noise sources

Cattle in a feedlot make very little noise. The main noise sources during operation would be dominated by vehicle movements. Trucking noise would be a regular noise occurring on a daily basis. The buffer zone available around the site is in the order of 2 kms before noise would disturb neighbouring residences. No direct heavy vehicle movement data was received for the project. The following section details our assumptions on which the traffic noise assessment is based.

The expansion of the existing feedlot will generate additional traffic when compared to current traffic generated from the site. The heavy vehicle traffic will consist of grain deliveries and cattle trucks. The grain and cattle truck deliveries to the site will consist of existing trucks being diverted to the feedlot site. The light vehicle traffic will include staff and service vehicles.

The additional traffic associated with the proposed development is considered to represent a minimal increase to the existing traffic along Rushes Creek Rd and the B56 Oxley Highway. Traffic will enter/exit Angora from Rannock Burn Road. The existing entrance road is gravelled to provide all-weather access to the feedlot.

The anticipated numbers of heavy vehicle movements that will be generated by the proposed 10,900 head feedlot operation when operating at a 100% and 80% capacity have been calculated using the following assumptions:

- movement is one-way (i.e. a truck entering and leaving is considered two movements);
- cattle trucks enter and leave full;
- average cattle stay: 90 days;
- average cattle weight in: 350Kg;
- average cattle weight out: 550Kg;
- feed ration consumption will be approximately 13.5 kg per head per day, based on cattle feed consumption of 3% of cattle weight where average cattle weight is 450kg;
- all cattle and feed transport is based on dual-decker B-Doubles with a maximum load capacity of 92 head (IN) and 68 head (OUT);
- 1 head of cattle will produce 1,000 tonnes of manure per year, and that all manure will be transported off site using 4 axle prime mover and semi-trailer combination trucks, which have a carrying capacity of 30 tonnes;
- each pen is utilised for the equivalent of four separate lots of cattle each year; and
- some seasonal variations will occur.

Table 7-3 outlines the anticipated numbers of heavy-vehicle movements that are generated by the existing feedlot operation, and are predicted to be generated by the proposed expansion. It should be noted that traffic generation has been calculated for the feedlot operating at 100% and 80% capacity, it is more likely that the feedlot will operate at 80% occupancy.

The calculations outlined in Table 7-3 assume that all manure produced on site will be transported offsite. However, it is likely that a proportion of manure produced on site will be retained for use on site (as nominated in the EUA areas as seen in Figure 7-2). As such, calculations indicate a ‘worst case’ traffic volume scenario. It is likely that actual traffic volumes generated by the proposed development will be lower than those predicted.

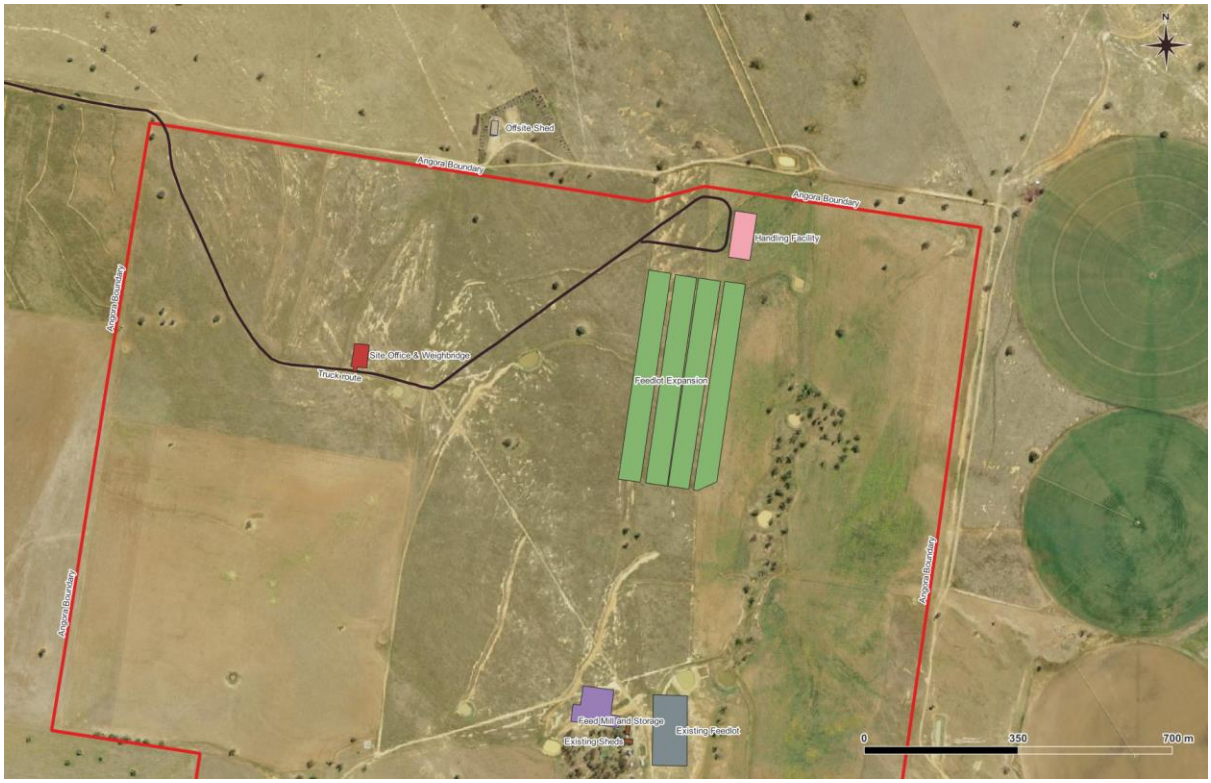
Table 7-3 Predicted Heavy vehicle traffic for Angora feedlot

Traffic Movements		
	Existing Feedlot (1,000 head)	Proposed Feedlot (10,900 head)
Maximum Occupancy (100%)		
Head Processed Annually	3,960	45,200
Cattle Truck Movements	101 Annually	1,156 Annually
	1.9 / week	22.2 / week
	< 1 / weekday	4.5 / weekday
Feed Truck Movements	162 Annually	1,856 Annually
	3 / week	35.6 / week
	< 1 / weekday	7.1 / weekday
Manure Truck Movements	33 Annually	377 Annually
	< 1 / week	7.2 / week
	< 1 / weekday	1.5 / weekday
Total Truck Movements	297 Annually	3,389 Annually
	6 / week	65 / week
	1.1 / weekday	13 / weekday
Maximum Occupancy (80%)		
Head Processed Annually	3,168	36,160
Cattle Truck Movements	81 Annually	925 Annually
	1.6 / week	17.8 / week
	< 1 / weekday	3.6 / weekday
Feed Truck Movements	130 Annually	1,485 Annually
	2.5 / week	28.5 / week
	< 1 / weekday	5.7 / weekday
Manure Truck Movements	26 Annually	301 Annually
	< 1 / week	5.8 / week
	< 1 / weekday	1.2 / weekday
Total Truck Movements	238 Annually	2,710 Annually
	4.6 / week	52.1 / week
	1 / weekday	10.4 / weekday

The SoundPlan model includes the maximum truck movements for the proposed feedlot expansion. Table 7-3 indicates 13 truck movements per day for the proposed feedlot of 10,900 head. The SoundPlan model includes noise emissions for two truck movements in a 15min period to represent the operational heavy vehicle noise activity for the proposed feedlot expansion. This is a considered conservative figure for the operational noise predictions.

The truck route has been modelled on Rannock Burn Road (from the intersection of Rushes Creek Road and Rannock Burn Rd) and along the Angora private haul road to the proposed onsite cattle handling facility. Truck noise emissions have been modelled with a speed of 40 km/hr on the gravel roads. Figure 7-3 shows the heavy vehicle truck route used in the SoundPlan noise model.

Figure 7-3 Proposed operational heavy vehicle truck route



7.1.1.3 Predicted Operational noise levels

Table 7-4 provides a summary of the predicted operational noise levels at the four closest sensitive receptors adjacent to the project. Sensitive receptors are defined in section 3 of this report.

Table 7-4 Predicted Operational noise levels and noise criteria

Receptor	Day criterion, dBA	Predicted daytime noise level, dBA	Evening criterion, dBA	Predicted evening noise level, dBA	Night Criterion, dBA	Predicted night-time noise level, dBA
1	40	28	43	7	38	7
2	40	30	43	12	38	12
3	40	29	43	8	38	8
4	40	32	43	10	38	10
Caretaker	40	36	43	21	38	21

Table 7-4 indicates the predicted noise levels for sensitive receptors outside the Angora property comply with the project noise trigger levels. The expanded feedlot can as such operate continuously at the site without the need for noise mitigation measures. Appendix B presents noise maps of the predicted operational noise levels.

7.1.1.4 Sleep Disturbance Assessment

The potential for sleep disturbance from maximum noise level events from premises during the night-time period forms part of this assessment. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

The NPfI states that, "*where the subject development/premises night-time noise levels at a residential location exceed:*

- *LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

a detailed maximum noise level event assessment should be undertaken."

Pneumatic valves are the highest level impulsive noise source to operate in the feed mill in the evening or night periods. The noise model has a assumed a sound power level of 95 dBA for the activation of pneumatic valves.

At the nearest receptor (the Caretaker dwelling), the noise level is predicted to be 21 dBA. This is well below the project noise trigger level of L_{AFmax} 52 dBA. Therefore, sleep disturbance is within the noise trigger level.

The closest residence not associated with the feedlot operation is located at a distance of approximately 2 km south south-east of the site. Noise attenuation over this distance is significant and therefore noise emissions from the mill, including trucks and milling operations are not predicted to disturb the amenity at this residence.

Noise attenuation between the feedlot site and the closest receptor has been determined to be sufficient based on the available buffer distances to meet the above criteria.

7.1.2 Construction Noise assessment

The magnitude of off-site noise impacts associated with construction would be dependent upon a number of factors such as:

- the intensity and location of construction activities;
- the type of equipment used;
- existing local noise sources;
- intervening terrain; and
- the prevailing weather conditions.

During any given period, the machinery items to be used in the study area would operate at maximum power for only brief stages. At other times, the machinery may produce lower sound levels while carrying out activities not requiring full power. It is highly unlikely that all construction equipment would be operating at their maximum power levels at any one time and certain types of construction machinery would be present in the study area for only brief periods during construction.

It is understood that the construction works associated with the proposal will generally involve the creation of the proposed cattle yard pens, along with a site office with weighbridge, feedlot sheds, silage pits, hay shed, machinery workshop and a feed mill. The proposed feedlot expansion is shown in Figure 7-1 and Figure 7-2.

The parameters for predicting construction noise impacts are summarised in the following points:

- all construction equipment noise sources (including associated sound power levels) related to the proposed construction works are outlined in Table 7-5;
- the location of the construction noise sources is shown in Figure 7-1, and the height of noise sources has been modelled at 1.5 metres above ground level;
- airborne noise has been calculated in this assessment;
- two construction scenarios have been assessed;
- sensitive receptors are shown in Figure 3-1;
- site features (including topography, buildings and surrounding land uses) that affect noise propagation has been included in the SoundPlan model;

- proposed construction hours are assumed to be standard hours; and
- no other concurrent construction works in the vicinity have been included as additional noise.

7.1.2.1 Construction Noise Scenarios

The construction noise assessment considers two construction scenarios. The construction scenarios include preliminary clearing and earthworks, along with soil compaction and concrete works, refer Table 7-5 for construction scenarios.

7.1.2.2 Construction Noise sources

The construction equipment for each scenario, along with the associated sound power level is summarised in Table 7-5. This table details the noise sources included in the noise model together with the sound power level (SWL) for each equipment item. Noise levels in the table have been obtained from similar projects and are assumed to be applicable to this project.

The construction of the proposed feedlot expansion is considered a reasonably small project. It is expected that a maximum of up to six construction equipment items will be in operation at any given time during for each construction scenario. The noise model has included six items for each construction scenario, these items have been nominated in Table 7-5.

Table 7-5 Sound power levels for Construction scenarios

CONSTRUCTION Scenario	Equipment	SWL dBA re 10-12 W
Scenario 1 **Earthworks, spoil removal**	20t Excavator	107
	Truck & Dog	105
	14t Roller	108
	Dump Truck	117
	Dozer	108
	Scraper	116
Scenario 2 **Compaction and formation**	Truck and dog	105
	20t excavator	107
	Grader	110
	Water truck	107
	Concrete Truck	109
	Concrete Pump	108

7.1.3 Predicted Construction Noise levels and noise criteria for Construction Scenarios

Table 7-6 shows the predicted L_{Aeq} noise levels and the noise criteria for the day, evening and night-time periods without noise mitigation measures.

Table 7-6 Predicted Construction noise levels and noise criteria for Scenario 1

Receptor	Day criterion, dBA	Predicted daytime noise level, dBA	Evening criterion, dBA	Predicted evening noise level, dBA	Night Criterion, dBA	Predicted night-time noise level, dBA
1	45	34.2	45	34.2	42	n/a
2	45	35.0	45	35.0	42	n/a
3	45	33.7	45	33.7	42	n/a
4	45	35.9	45	35.9	42	n/a
Caretaker	45	42.2	45	42.2	42	n/a

Table 7-6 indicates the predicted construction scenario 1 noise levels for sensitive receptors comply with the project construction noise criteria. Construction scenario 1 can as such operate at the site without the need for noise mitigation measures in standard hours. Appendix B presents noise maps of the predicted noise levels. It is advised that construction works are limited to standard hours.

Table 7-7 Predicted Construction noise levels and noise criteria for Scenario 2

Receptor	Day criterion, dBA	Predicted daytime noise level, dBA	Evening criterion, dBA	Predicted evening noise level, dBA	Night Criterion, dBA	Predicted night-time noise level, dBA
1	45	30.1	45	30.1	42	n/a
2	45	30.8	45	30.8	42	n/a
3	45	29.4	45	29.4	42	n/a
4	45	31.5	45	31.5	42	n/a
Caretaker	45	38.3	45	38.3	42	n/a

Table 7-7 shows the predicted construction scenario 2 noise levels for sensitive receptors comply with the project construction noise criteria. Construction scenario 2 can as such operate continuously at the site without the need for noise mitigation measures. Appendix B presents noise maps of the predicted noise levels. It is advised that construction works are limited to standard hours.

8 NOISE ON PUBLIC ROADS

Vehicle movements during the construction phase will generally be limited to light vehicles associated with contractors who may be required for minor assistance during the expansion of the feedlot. A nominal two light vehicles per day (4 trips) accessing the site has been assumed for both construction and operation. It has also been assumed that during a peak day there will be a doubling of light vehicle movements.

The described light vehicles will generate negligible noise emissions and would not require consideration at the relevant residential receptor given the significant distance separation.

It is understood that operational traffic generation will likely be the more relevant source of noise. Table 7-3 indicates the predicted heavy vehicle traffic for the proposed expansion of the Angora Feedlot. This shows an additional 13 truck movements per day.

Traffic volumes provided by Transport for NSW for the Oxley Highway indicate 3,354 average daily traffic count, with 23% heavy vehicle volume. This equates to approximately 771 truck and 2583 light vehicles movements per day.

The total increase in heavy vehicles on the Oxley Highway represents a 1.66% increase to the existing traffic volumes. The described increase represents a modest change in the existing traffic volumes and would not be expected to impact adversely on the acoustic environment.

9 VIBRATION ASSESSMENT

9.1 VIBRATION SOURCES

The potential sources of vibration on the cattle feedlot site include the construction of new facilities, the operation of machinery such as tractors, trucks, and other heavy vehicles, operation of the feedmill as well as the movement of cattle and personnel on the site.

Table 9-1 and Table 9-2 nominate the equipment expected to be used for both operation and construction of the proposed cattle feedlot. The tables show the most significant vibration source is the 14t vibratory roller.

Table 9-1 Operation Equipment with reference vibration levels

OPERATION	Equipment	Vibration level @ 2m ref (mm/s)
	Machinery Workshop	0.11
	Tractor clearing pens x2	0.33
	Forklift	0.33
	Front end loader	0.33
Feed Mill - including: **< 1kW Motors x4** **1kW - 5 kW motors x11** **5kW - 10kW motors x2** **30kW motors x2**	Screw conveyors x9	0.11
	Compressor	0.11
	Bucket elevator x2	0.11
	Cyclone dust separator	0.11
	Flaking mill	0.11
	Pneumatic valves	0.11

Table 9-2 Construction Equipment with reference vibration levels

Construction Scenario	Equipment	Vibration level @ 2m ref (mm/s)
Scenario 1: Earthworks, spoil removal	20t Excavator	0.33
	Truck & Dog	0.33
	14t Vibratory Roller	21.2
	Dump Truck	0.33
	Skid Steer Loader	0.33
	Dozer	9.78
	Scraper	1.52
	Front End Loader	0.33
Scenario 2: Compaction and formation	Grader	0.33
	Truck and dog	0.33
	20t excavator	0.33
	Grader	0.33
	Water truck	0.33
	12t roller	12.25
	Skid steer loader	0.33
	Concrete Truck	0.33
	Concrete Pump	0.33

9.2 VIBRATION ASSESSMENT

This vibration assessment follows the procedures included in the US Federal Transit Administration's Transit noise and vibration impact assessment (1995) and the Transport Research Laboratory's Groundborne vibration caused by mechanised construction works (Hiller & Crabb, 2000).

The vibration criteria for long term vibration exposure have been applied from Australian Standard AS2670.2 – *Evaluation of human exposure to whole-body vibration Part 2: Continuous and shock induced vibration in buildings (1-80Hz)*. This Australian standard presents guidance with respect to the annoyance (nuisance) for human beings.

Vibratory compaction is the highest vibration generating activity listed in the project operations. Refer section 9.1 of the report for vibration sources relating to operation and construction of the proposed cattle feedlot.

A 14t vibratory roller is predicted to generate 21.2mm/s peak particle velocity (PPV) values at a reference distance of 2 metres, when using the vibration prediction method contained in Chapter 7 of the US Federal Transit Administration (FTA) document entitled '*Transit noise and vibration impact assessment manual, 2018*.

Where:

PPV = resulting peak particle velocity (mm/s)
PPV_{source} = source reference peak particle velocity (mm/s @ 7.6m)
D = distance (ft)
K = ground factor (note: a standard ground factor (K) of 1.1 has been adopted for this assessment)

To achieve the minimum long term vibration criterion of 0.1 mm/s, the vibratory roller would be required to be at least 282 metres from a vibration sensitive receptor. Table 9-3 provides the approximate distances from the proposed project operation and construction activity in relation to the nearby sensitive receptors.

Table 9-3 Sensitive receptor compliance with vibration criteria

Sensitive Receptor Number	Address	Approx distance from vibration source to receptor (m)	Minimum compliance distance (m)	Complies with vibration criteria
1	Rushes Creek Rd, Rushes Creek NSW 2346	2775	282	YES
2	Oxley Highway, Somerton NSW 2340	2400	282	YES
3	Oxley Highway, Somerton NSW 2340	2500	282	YES
4	Oxley Highway, Somerton NSW 2340	2000	282	YES
Caretaker	Rushes Creek Rd, Rushes Creek NSW 2346	1550	282	YES

Table 9-3 shows that all sensitive receptors are located at a distance greater than 282 metres from the highest vibration source relating to the project. It is therefore concluded that vibration emissions from both operation and construction of the proposed project will not impact the surrounding sensitive receptors and that vibration levels will be in compliance with the recommended guidelines.

10 CONCLUSION

A noise and vibration assessment have been assessed in accordance with the specified NSW Planning Secretary's Environmental Assessment Requirements SEAR 1696 (EF22/7962) to determine the noise impacts associated with the proposed expansion of the Angora cattle feedlot installation on Rannock Burn Road, Rushes Creek, NSW, postcode 2346 on Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169.

The 'Angora' property operates an existing cattle feedlot for up to 100 head. The existing feedlot is proposed to expand to accommodate 1,400 head. In addition, it is proposed to construct a new cattle feedlot to accommodate 9,500 head. Therefore, the total proposed cattle feedlot operation could accommodate 10,900 head.

The objectives of this noise and vibration assessment have:

- determined the predicted noise and vibration impacts on sensitive receptors located near to the Project for both construction and operational phases;
- determined the levels of mitigation likely to be required, if applicable, to enable compliance with the NSW Planning Secretary's Environmental Assessment Requirements; and
- provide relevant noise and vibration information for the preparation of an Environmental Impact Statement (EIS) for the Project development proposal.

The results of this assessment confirms that construction noise associated with the proposed development conforms to the NSW Interim Construction Noise Guideline (DECC, 2009).

The vibration from all activities (including operation and construction) to be undertaken as part of the cattle expansion proposal on the 'Angora' property are in compliance with the guidelines contained in the NSW 'Assessing Vibration: a technical guideline (DEC, 2006)'.

No blasting is required for this project, therefore a blasting assessment has not been conducted.

Operational noise from all industrial activities (including private haul roads) to be undertaken on the premises conforms to the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017).

Noise on public roads from increased road traffic generated by land use developments conforms to the requirements of the guidelines contained in the NSW Road Noise Policy and associated application notes (EPA, 2011).

The assessment has determined the noise criteria (project noise trigger levels) for the site. The project noise trigger levels are as follows:

- Daytime: $L_{Aeq,15min}$ 40 dBA
- Evening: $L_{Aeq,15min}$ 43 dBA
- Night-time: $L_{Aeq,15min}$ 38 dBA
- Night-time: L_{AFmax} 52 dBA

The noise assessment shows that the site is predicted to be in compliance with the project noise criteria. No noise mitigation is required for compliance with the project noise trigger levels for both construction and operation.

Acoustic amenity of the area will not change significantly as a result of the proposed cattle feedlot expansion.

11 GLOSSARY

NSW Noise Policy for Industry Glossary:

Term	Definition
Above ground level (AGL)	Above ground level.
A-weighted	See dB(A).
Ambient noise	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.
Amenity noise level	See the fourth column of Table 2.2 of NPfI.
Annoyance	An emotional state connected to feelings of discomfort, anger, depression and helplessness. It is generally measured by means of the ISO15666 defined questionnaire (EEA, 2010).
Assessment period	The period in a day over which assessments are made: day (7 am to 6 pm); evening (6 pm to 10 pm); or night (10 pm to 7 am).
Assessment background level (ABL)	The single-figure background level representing each assessment period: day, evening and night (that is, three assessment background levels are determined for each 24-hour period of the monitoring period). Its determination is by the methods described in Fact Sheet B.
Background noise	The underlying level of noise present in ambient noise, generally excluding the noise source under investigation, when extraneous noise is removed. This is described using the LAF90 descriptor.
Best available technology economically achievable (BATEA)	Equipment, plant and machinery incorporating the most advanced and affordable technology available to minimise noise output.
Best management practice (BMP)	Adoption of particular operational procedures that minimise noise while retaining productive efficiency.
C-weighted	C-weighting is an adjustment made to sound-level measurements that takes account of low-frequency components of noise within the audibility range of humans.
Cluster of industry	An industrial/port estate, area, zone, or proposed area or zone where more than three separate industrial uses are co-located in a contiguous fashion and are operating or proposed to operate.
Compliance	The process of checking that source noise levels meet with the noise limits in a statutory context.
Construction activities	Activities that are related to the establishment phase of a development and that will occur on a site for only a limited period of time.
Cumulative industrial noise level	The total level of noise from all industrial sources.
Day	The period from 7 am to 6 pm (Monday to Saturday) and 8 am to 6 pm (Sundays and public holidays).
Decibel (dB)	A measure of sound level. The decibel is a logarithmic way of describing a ratio. The ratio may be power, sound pressure, voltage, intensity or other parameters. In the case of sound pressure, it is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure squared to a reference sound pressure squared.

Term	Definition
decibel (A-weighted; dB[A])	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
EP&A Act	Environmental Planning and Assessment Act 1979.
Evening	Refers to the period from 6 pm to 10 pm.
Extraneous noise	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Feasible and reasonable mitigation	As defined in Fact Sheet F.
Greenfield site	Undeveloped land.
High traffic amenity level	See Section 2.4.1.
Impulsive noise	Noise with a high peak of short duration, or a sequence of such peaks.
Industrial noise sources	As defined in Section 1.4.
Intrusive noise	Refers to noise that intrudes above the background level by more than 5 decibels. The intrusiveness noise level is set out in Section 2.3.
LAF90,15min dB	The A-weighted sound pressure level measured using fast time weighting that is exceeded for 90% of the time over a 15-minute assessment period. This is a measure of background noise.
LAF90,(day, evening, night) dB	The A-weighted sound pressure level measured using fast time weighting that is exceeded for 90% of the time over a day, evening or night-time assessment period. This is a measure of background noise.
LAF90,(shoulder period) dB	The A-weighted sound pressure level measured using fast time weighting that is exceeded for 90% of aggregate sound pressure level data for the equivalent of one week's worth of valid data taken over the shoulder period.
LAeq,T	The time-averaged sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, with a measurement time interval T, has the same mean square sound pressure level as a sound under consideration with a level that varies with time (AS1055.1-1997).
LAmax	The maximum sound pressure level of an event measured with a sound level meter satisfying AS IEC 61672.1-2004 set to 'A' frequency weighting and fast time weighting.
Low frequency	Noise containing major components in the low-frequency range (10 hertz [Hz] to 160 Hz) of the frequency spectrum.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street (Bies and Hansen, 1996).
Median	The middle value in a number of values sorted in ascending or descending order. Hence, for an odd number of values, the value of the median is simply the middle value. If there is an even number of values, the median is the arithmetic average of the two middle values.
Meteorological conditions	Wind and temperature-inversion conditions.

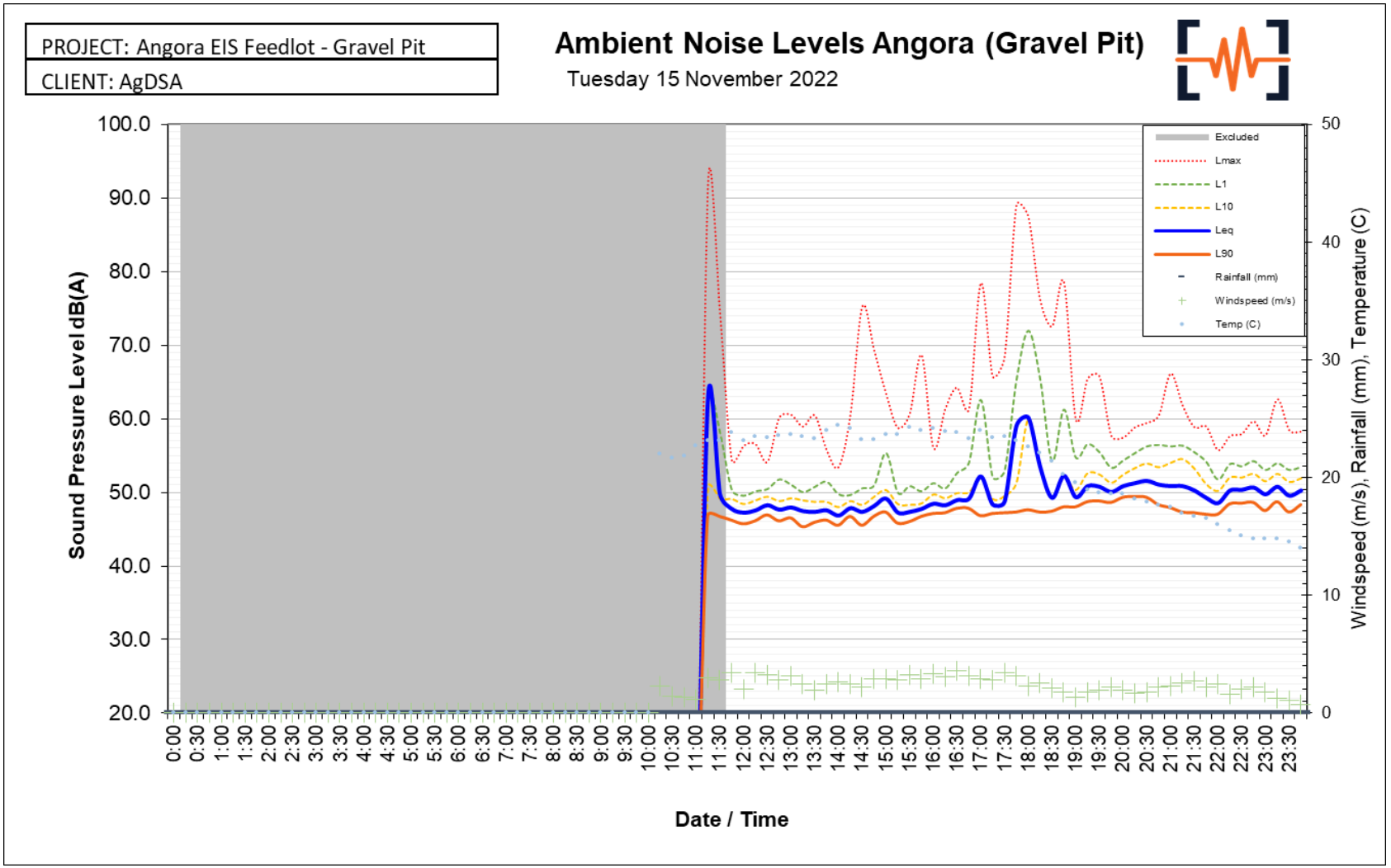
Term	Definition
Noise impact assessment (NIA)	The component of an Environmental Impact Statement, Environmental Assessment, Statement of Environmental Effects, or licence application that considers the impacts of noise resulting from a development or activity.
Noise limits	Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels which the proponent has predicted can be met during the environmental assessment.
Night	The period from 10 pm to 7 am (Monday to Saturday), and 10 pm to 8 am (Sundays and public holidays).
Noise-sensitive land uses	Land uses that are sensitive to noise, such as residential areas, churches, schools and recreation areas.
Non-compliance	Any exceedance of a consent/licence limit is considered a non-compliance. However, the type of regulatory action taken by a regulatory authority will depend on a number of factors, in accordance with the authority's prosecution policies and guidelines.
Non-mandatory	In this policy this means not required by legislation. The policy specifies project noise trigger levels to be strived for, but the legislation does not make these levels compulsory. However, the policy will be used as a guide to setting statutory (legally enforceable) limits for licences and consents.
Operator	Noise-source manager.
Performance-based goals	Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.
Premises	As defined in the Protection of the Environment Operations Act 1997.
Project noise trigger levels	Target noise levels for a particular noise-generating facility. They are based on the most stringent of the project intrusiveness noise level or the project amenity noise level.
Proponent	The developer of the industrial noise source.
POEO Act	Protection of the Environment Operations Act 1997
Rating background noise level (RBL)	The overall, single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-hour period used for the assessment background level). This is the level used for assessment purposes. See Fact Sheets A & B.
Residence	A lawful and permanent structure erected in a land-use zone that permits residential use (or for which existing use rights under the EP&A Act apply) where a person/s permanently reside and is not, nor associated with, a commercial undertaking such as caretakers' quarters, hotel, motel, transient holiday accommodation or caravan park.
Reasonably most-affected location	Locations that experience (or will experience) the greatest noise impact from the noise source under consideration. In determining these locations, one needs to consider existing background levels, exact noise source location(s), distance from source (or proposed source) to receiver, and any shielding between source and receiver. This should not be construed to mean that limits only apply at the worst, most-affected location.
Receiver	The noise-sensitive land use at which noise from a development can be heard.

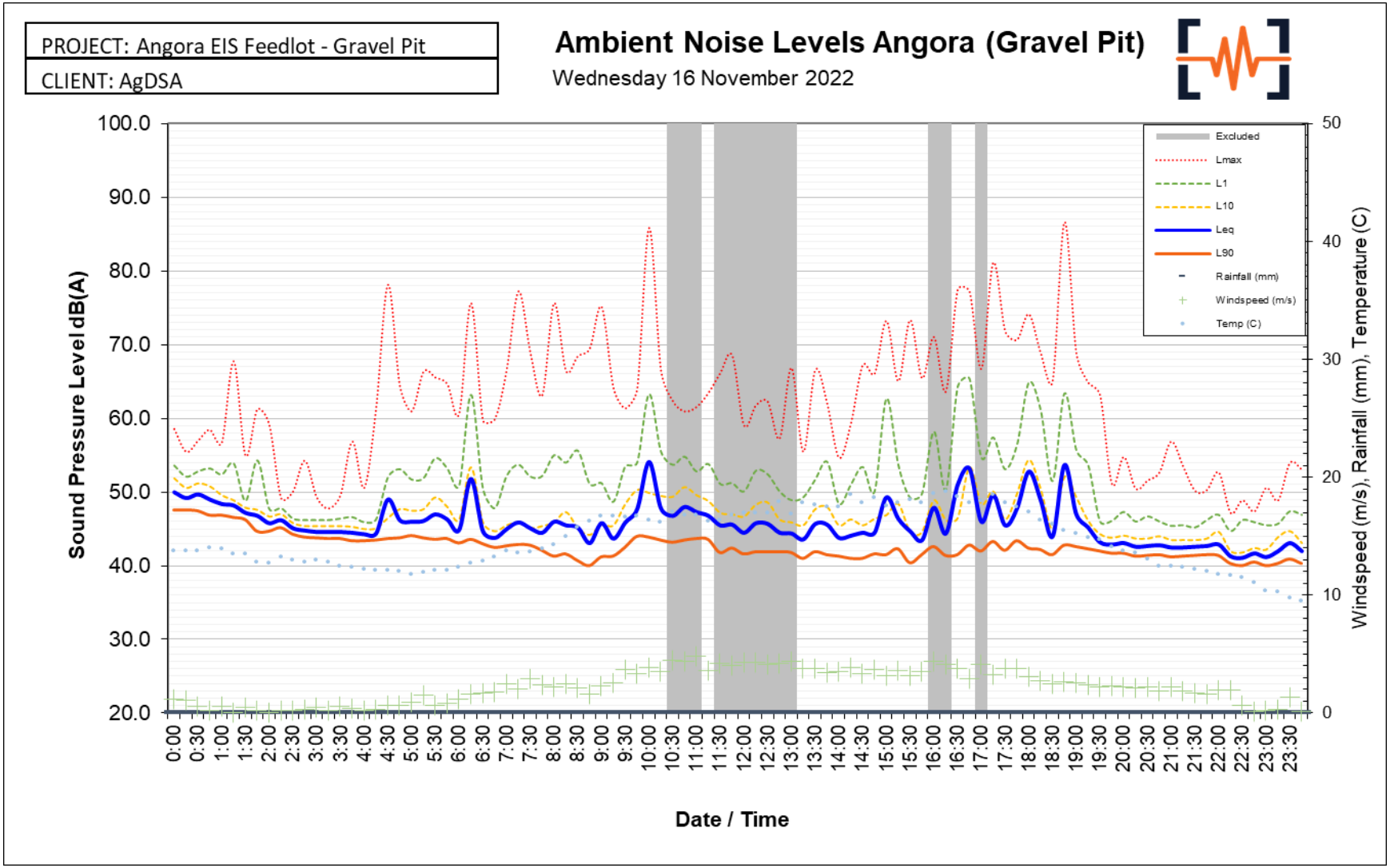
Term	Definition
Significant meteorological effects	In relation to temperature inversions, this means at least 30% of the total night-time during the winter months. In relation to wind speeds this means at least 30% of the time or more in any assessment period (day, evening, night) in any season.
Sleep disturbance	Awakenings and disturbance to sleep stages.
Spectral characteristics	The frequency content of noise.
Temperature inversion	An atmospheric condition in which temperature increases with height above the ground.
Temporal variation of noise	Variation in noise levels over time.
Tenth (10th) percentile method	See Fact Sheet B.
Time of maximum impact	The time during which the difference between the background noise level and the source noise is expected to be greatest.
Tonality	Noise containing a prominent frequency and characterised by a definite pitch.
Transportation	Includes road, rail and air traffic.
Very noise-enhancing meteorological conditions	Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions as adopted in the noise impact assessment following the procedures in Fact Sheet D.

NSW Assessing Vibration: a technical guideline Glossary:

Term	Definition
Term	Definition
Annoyance	Type of reaction felt by humans in response to vibration. The degree of annoyance felt by an individual may be assessed by using social survey Techniques
Best management practices (BMP)	The adoption of particular operational procedures that minimise vibration impacts effects while retaining productive efficiency
Best available technology economically achievable (BATEA)	Equipment, plant and machinery that incorporates the most advanced and affordable technology to minimise vibration output
Comfort	Subjective state of wellbeing in relation to an induced environment such as mechanical vibration (or shock). Comfort connotes the absence of disturbing or intrusive factors.
Crest factor	The ratio between the peak level and the rms value of a signal.
DEC	Department of Environment and Conservation
eVDV	Estimated vibration dose value
Feasible and reasonable measures	Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors: • vibration mitigation benefits (amount of vibration reduction provided, number of people protected) • cost of mitigation (cost of mitigation versus benefit provided) • community views (aesthetic impacts and community wishes) • vibration values for affected people (existing and future vibration values, and changes in vibration values)
Resonance	Resonance of a system in forced oscillation exists when any change in the frequency of excitation causes a decrease in a response of the system
rms	Root mean square
VDV	Vibration dose value
Vibration isolator	A support whose function is to attenuate the transmission of vibration in a frequency range
x-axis vibration	(pertaining to whole-body vibration) Mechanical vibration acting along the postero-anterior (back-to-front) axis of the human body.
y-axis vibration	(pertaining to whole-body vibration) Mechanical vibration acting laterally (sideways) upon the body.
z-axis vibration	(pertaining to whole-body vibration) Mechanical vibration acting along the caudocephalic (foot-to-head) axis of the human body.

APPENDIX A – NOISE RECORDS

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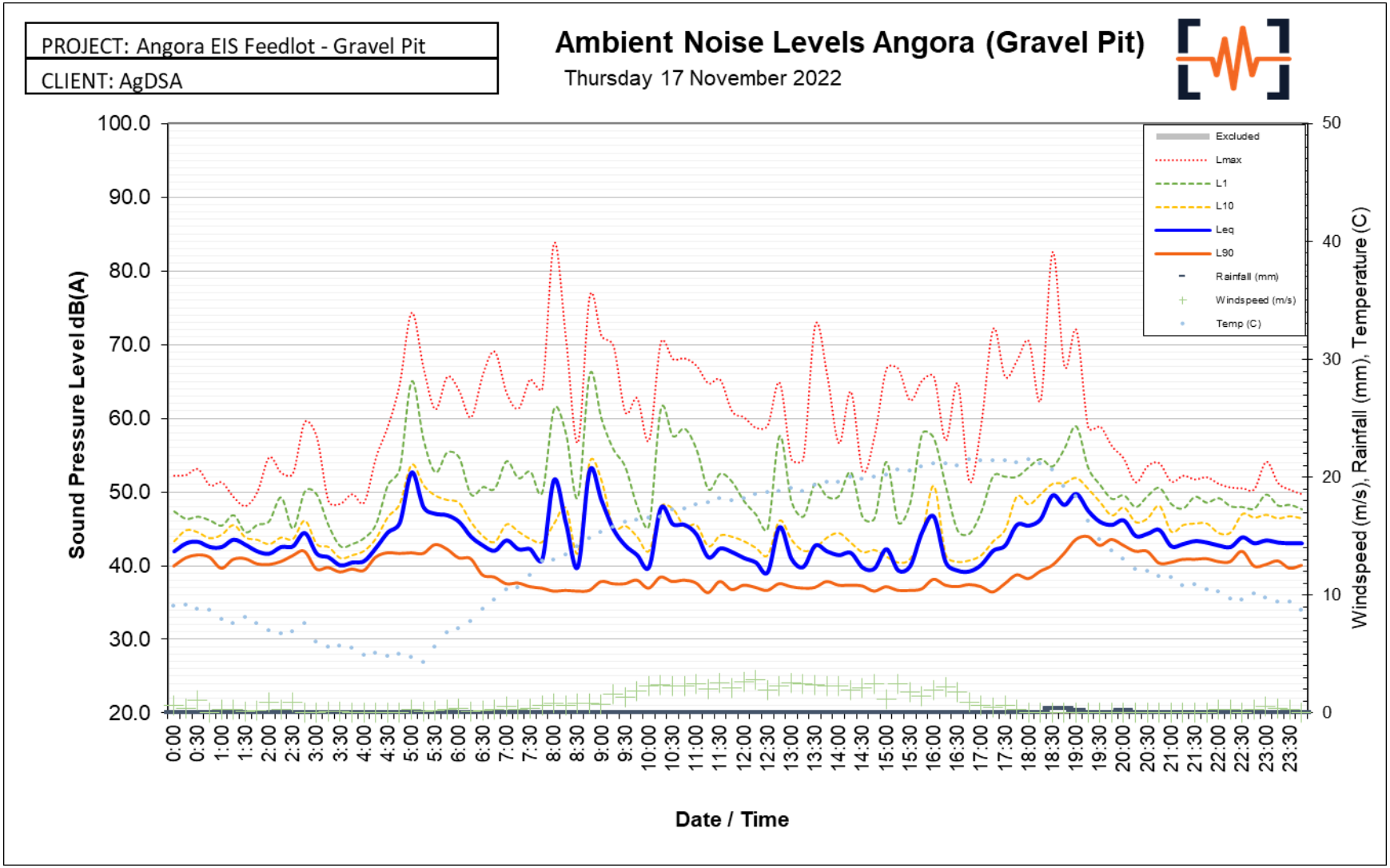
CLIENT: AgDSA
Ambient Noise Levels Angora (Gravel Pit)
Wednesday 16 November 2022
Excluded
Lmax
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)
Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time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CLIENT: AgDSA
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Date / Time
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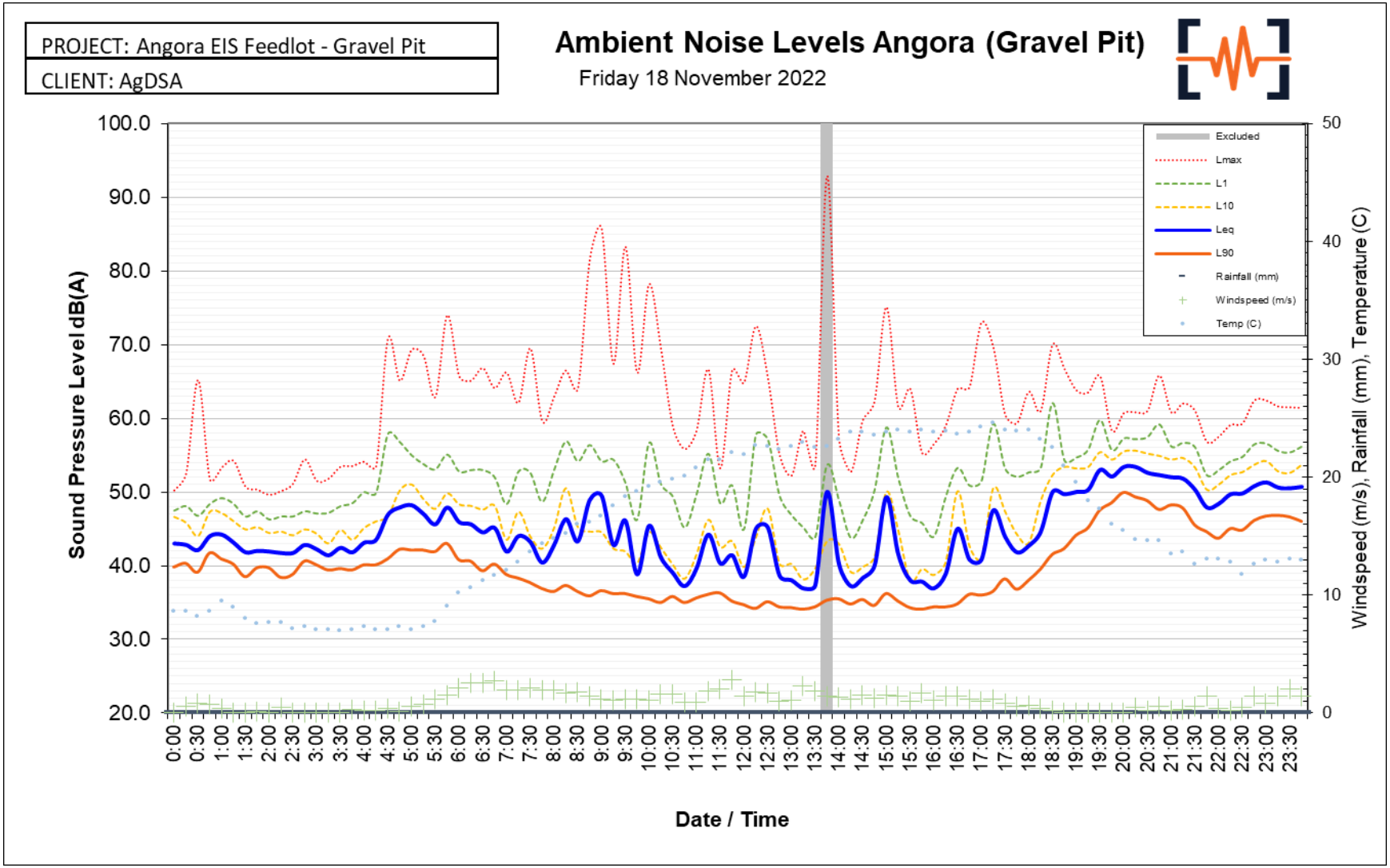
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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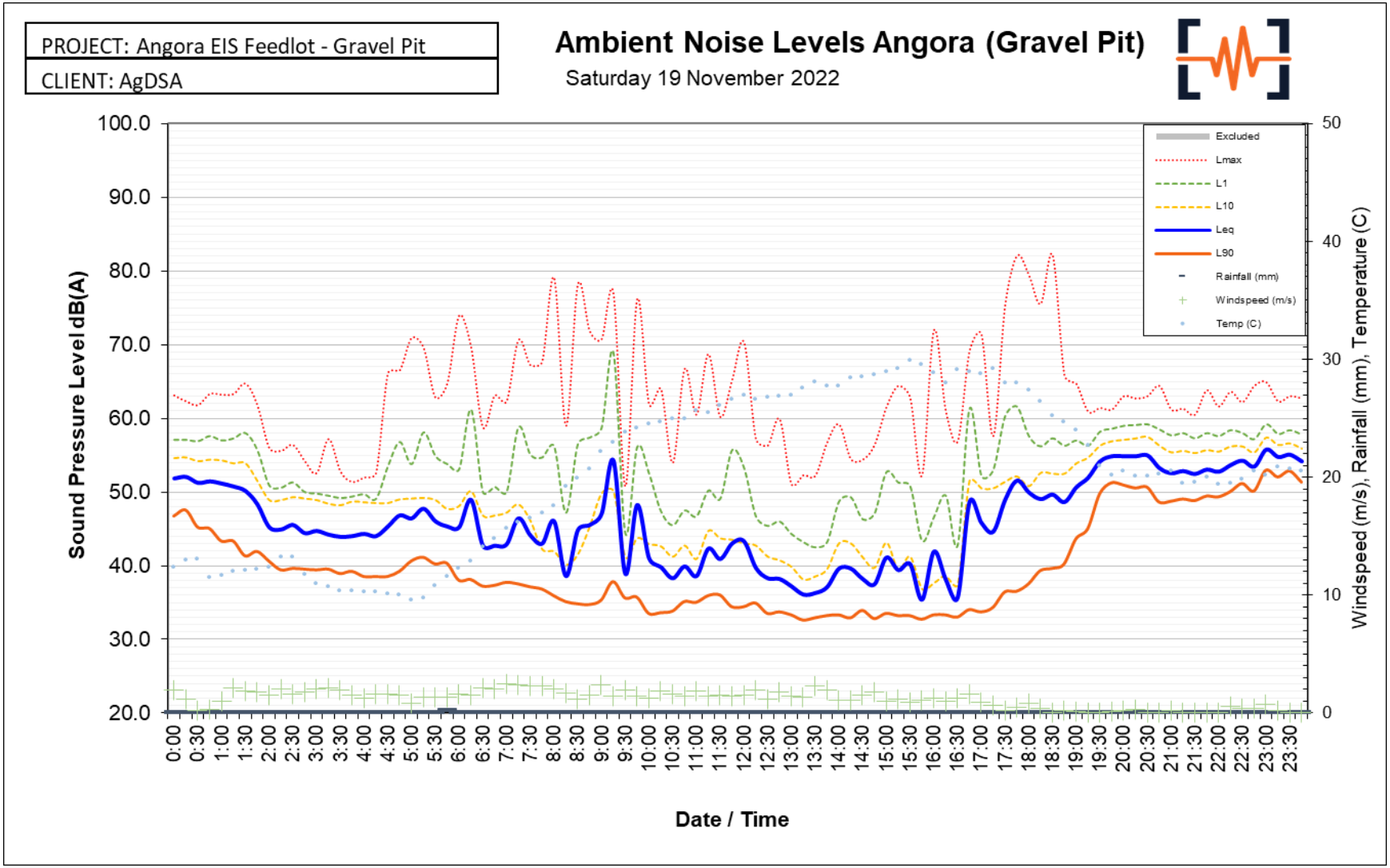
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
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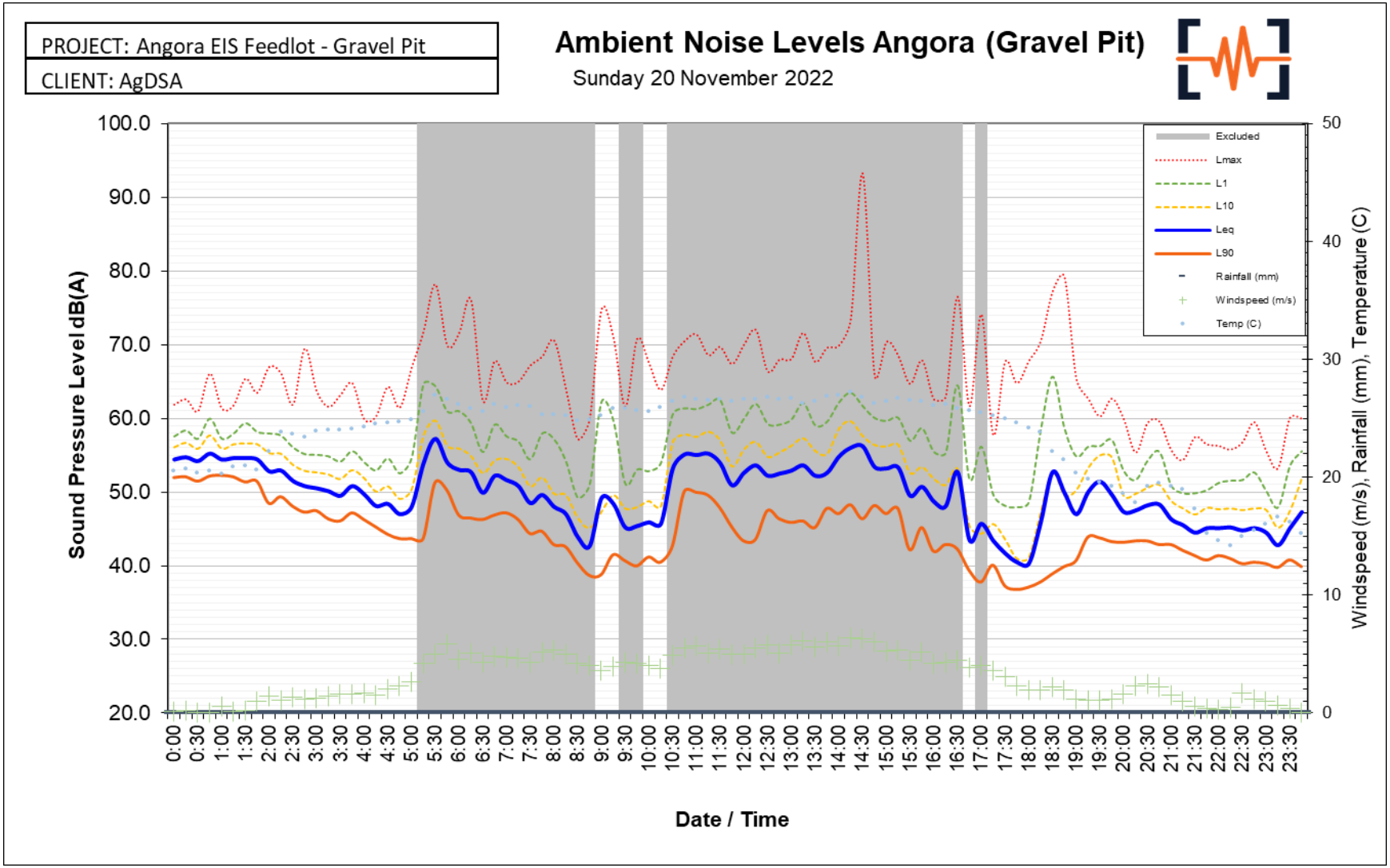
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Windspeed (m/s), Rainfall (mm), Temperature (C)
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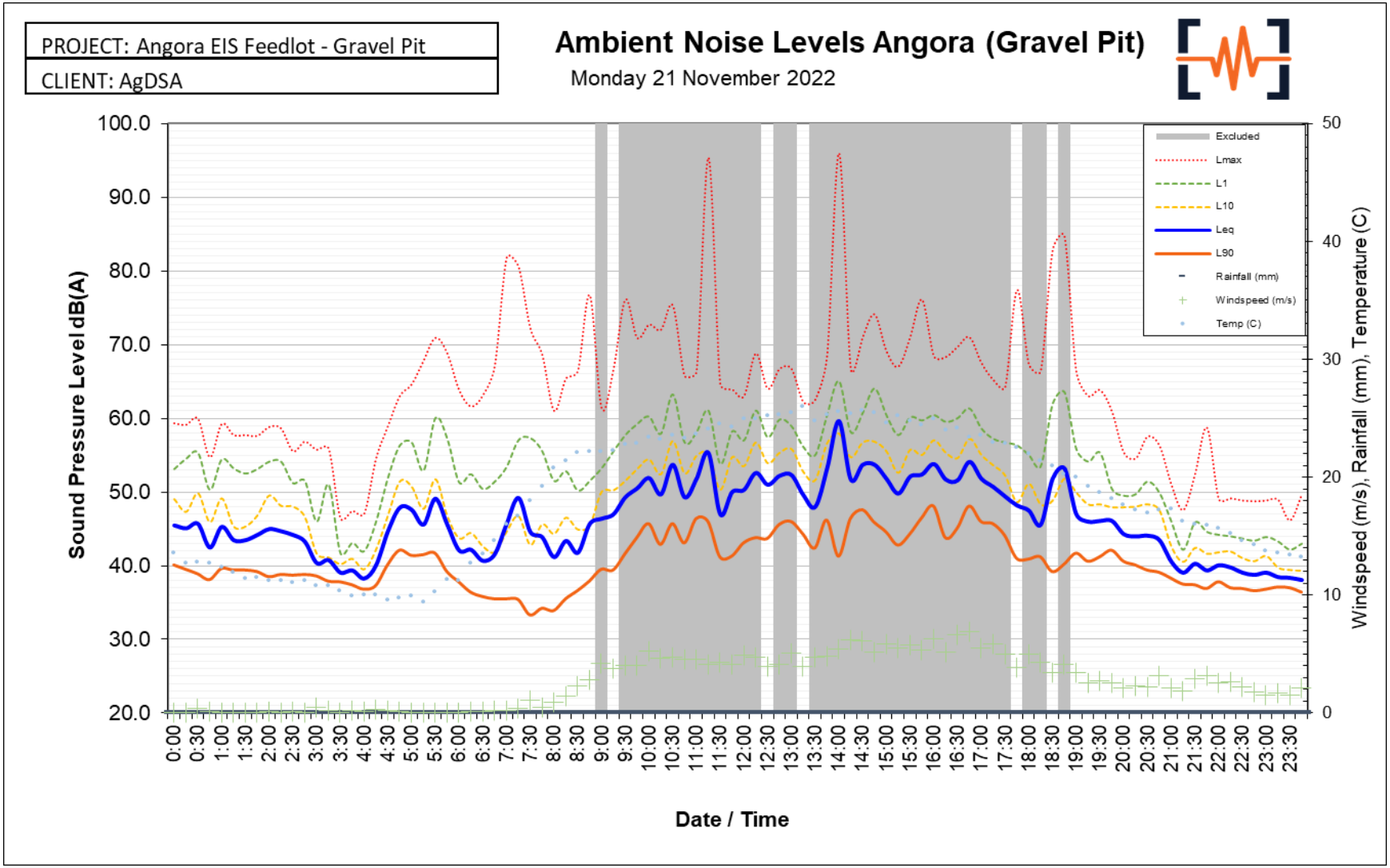
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Windspeed (m/s), Rainfall (mm), Temperature (C)
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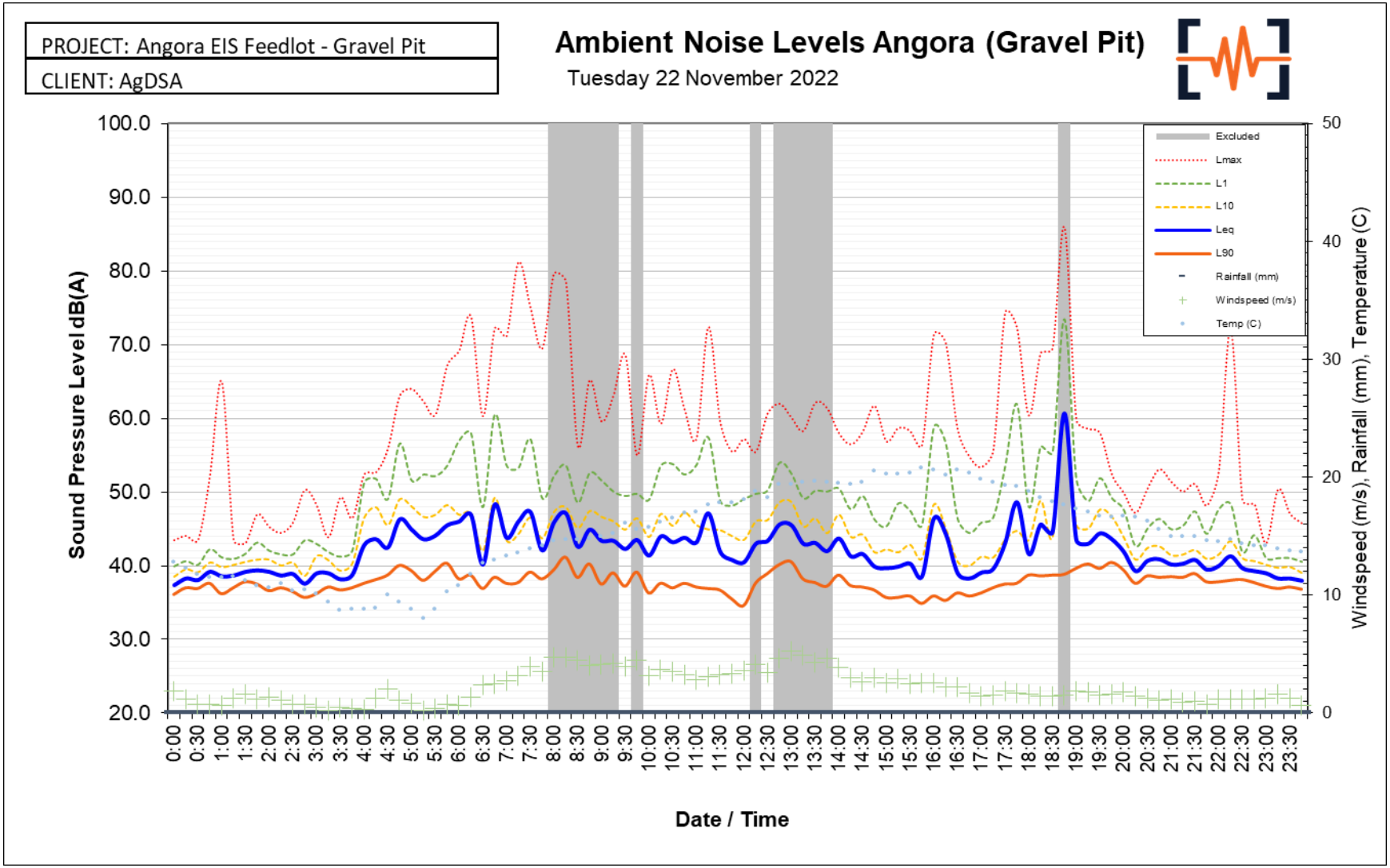
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Ambient Noise Levels Angora (Gravel Pit)
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Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
Excluded
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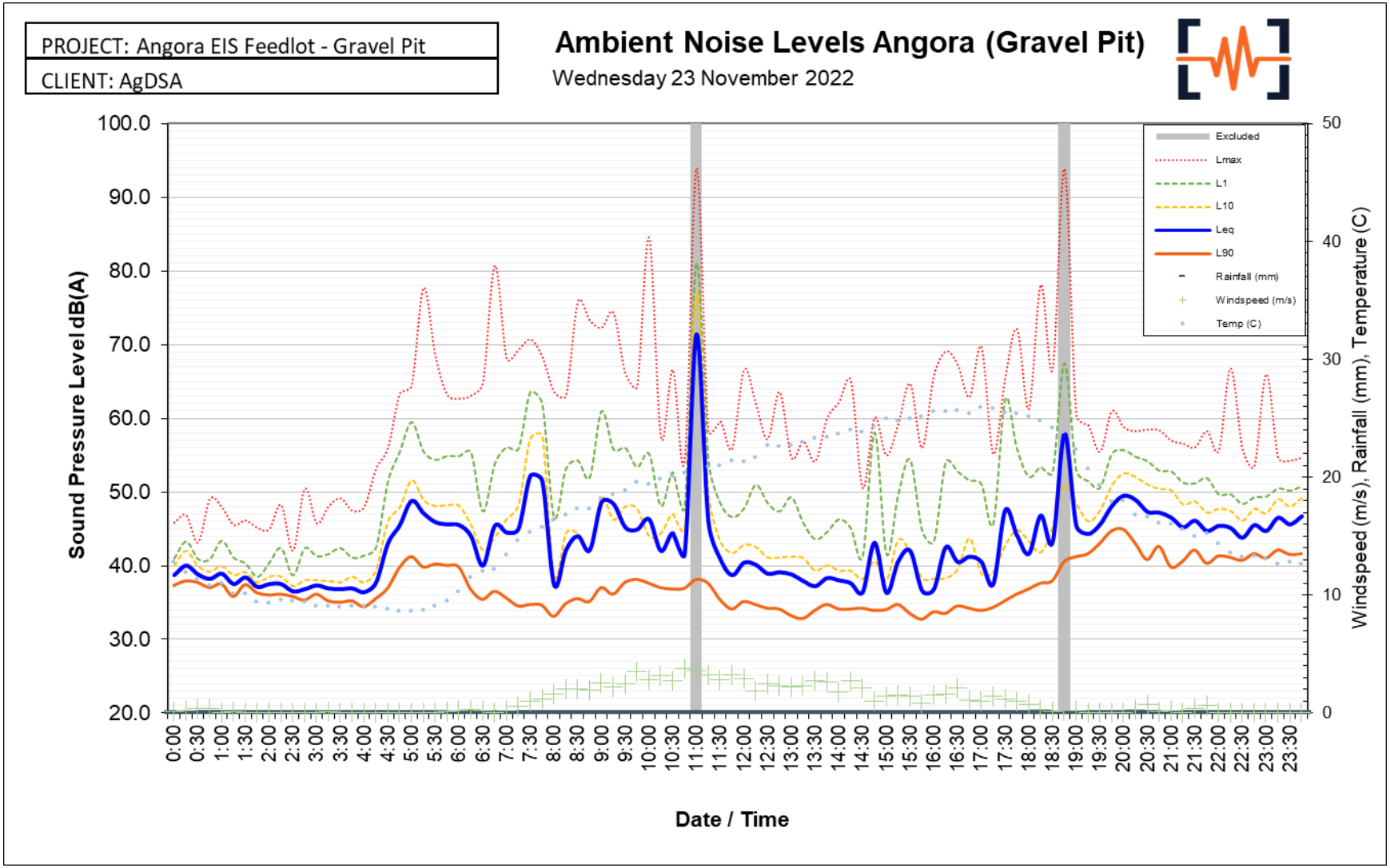
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Ambient Noise Levels Angora (Gravel Pit)
Wednesday 23 November 2022
Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
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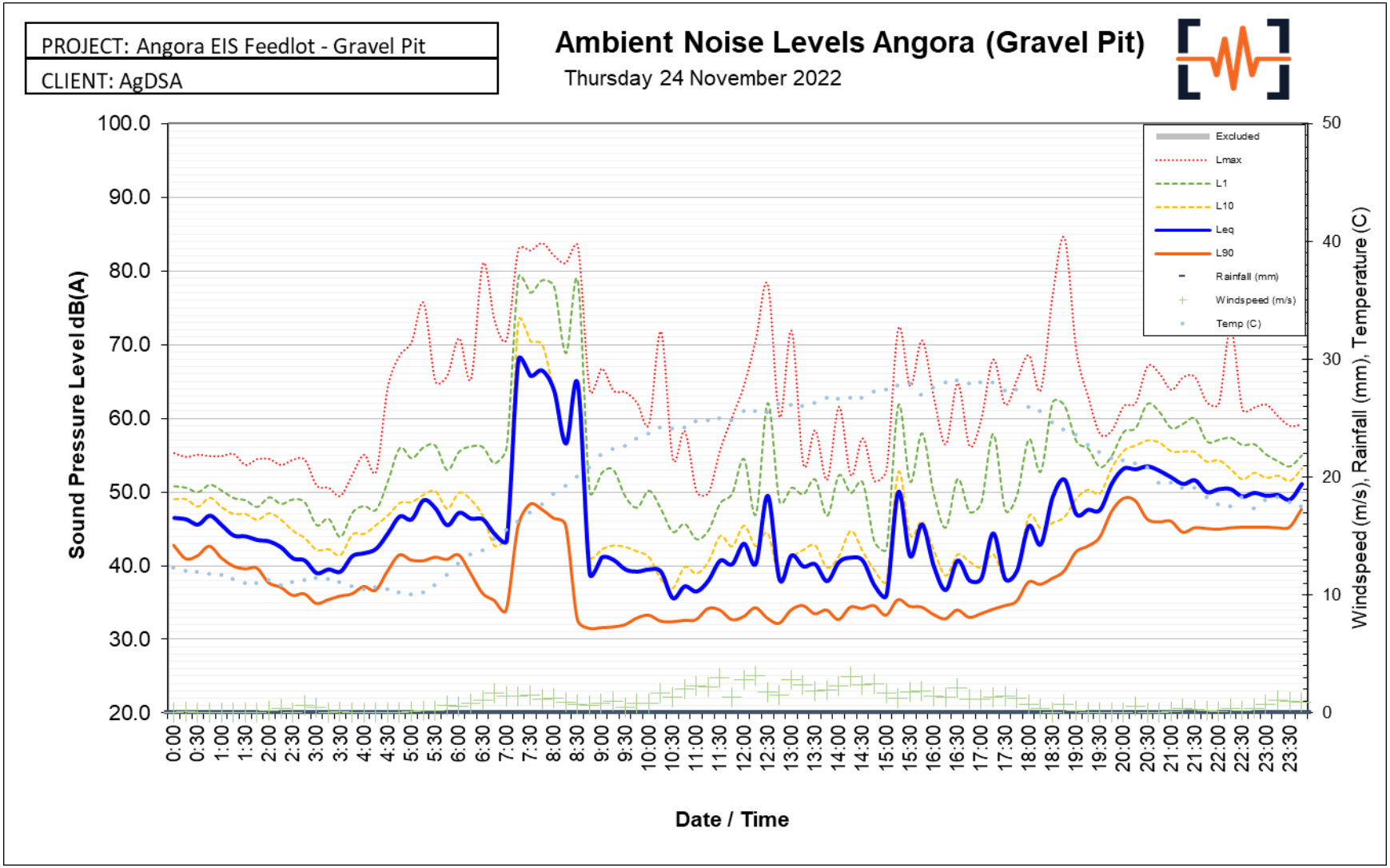
Lmax
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
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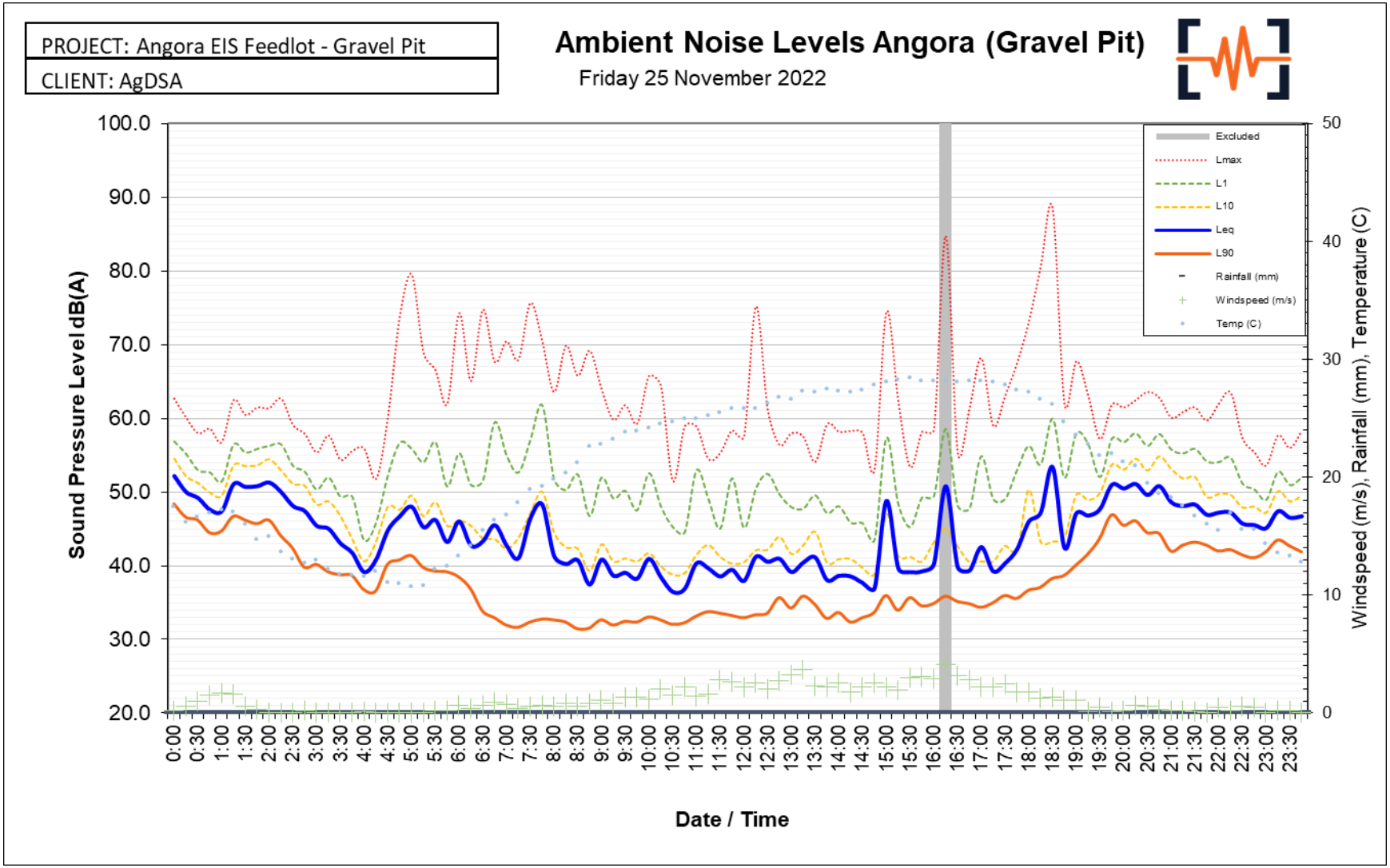
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Ambient Noise Levels Angora (Gravel Pit)
Friday 25 November 2022
Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
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Leq
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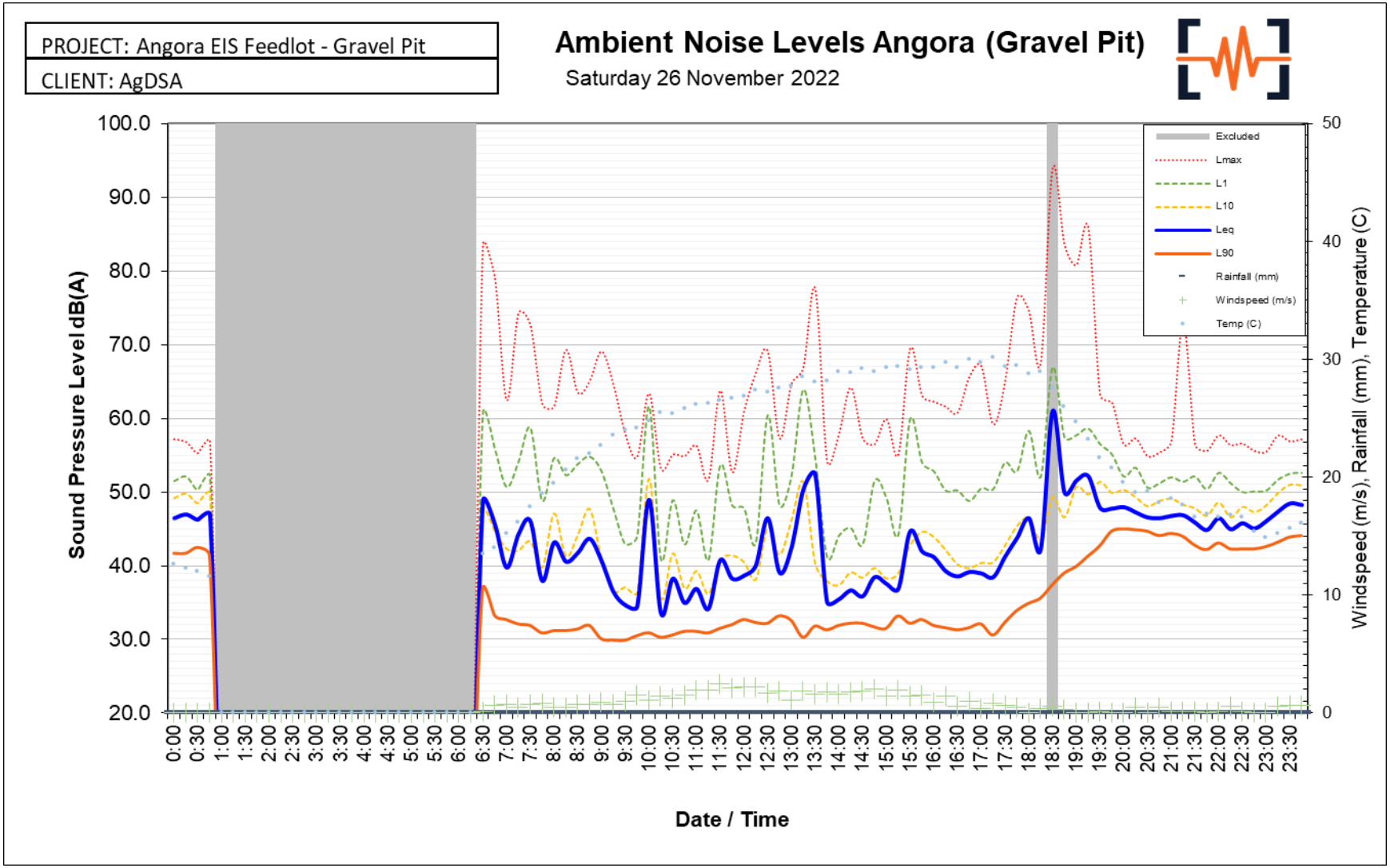
Rainfall (mm)
Windspeed (m/s)
Temp (C)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L10
Leq
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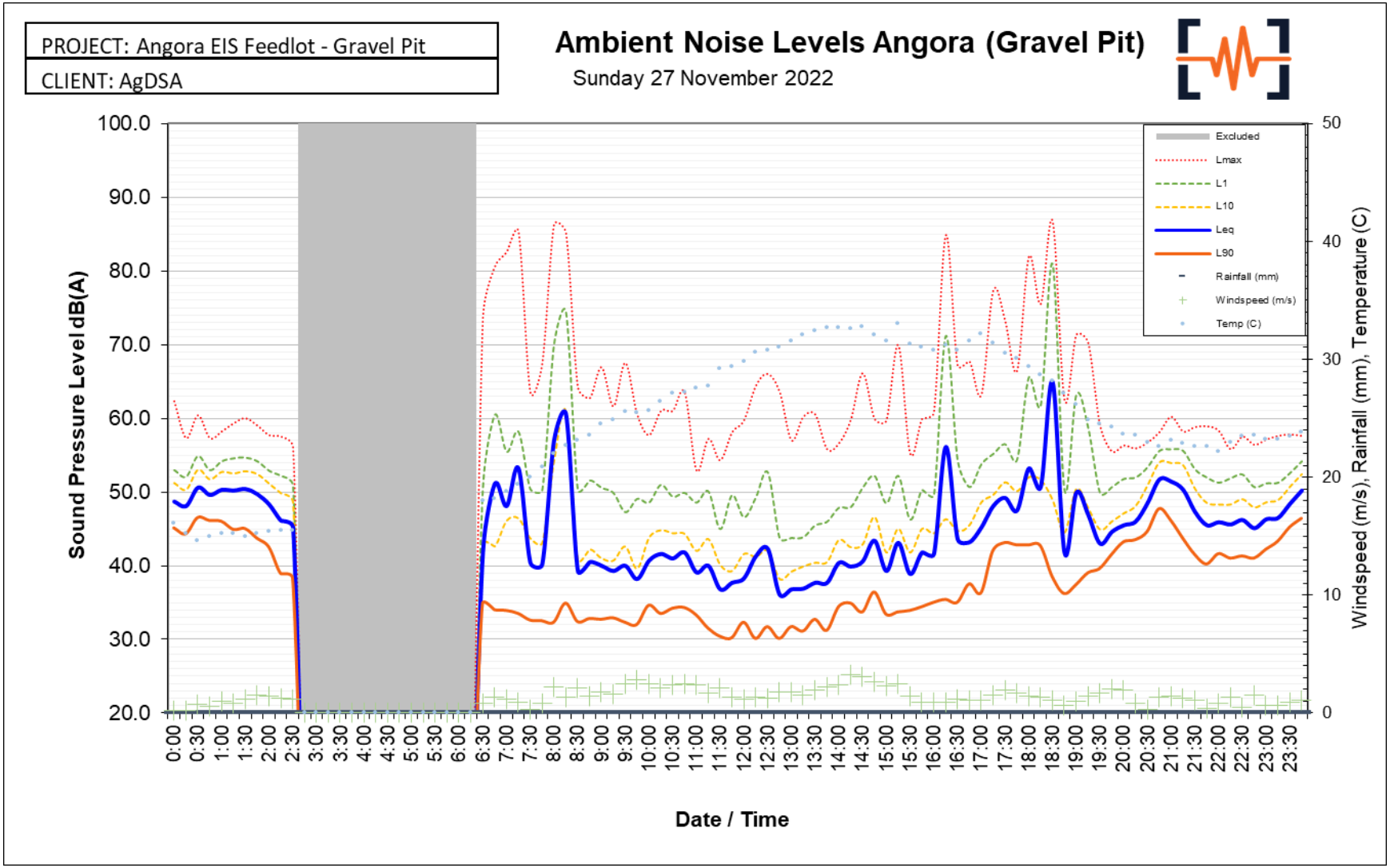
Windspeed (m/s)
Temp (C)
Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time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Ambient Noise Levels Angora (Gravel Pit)
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Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
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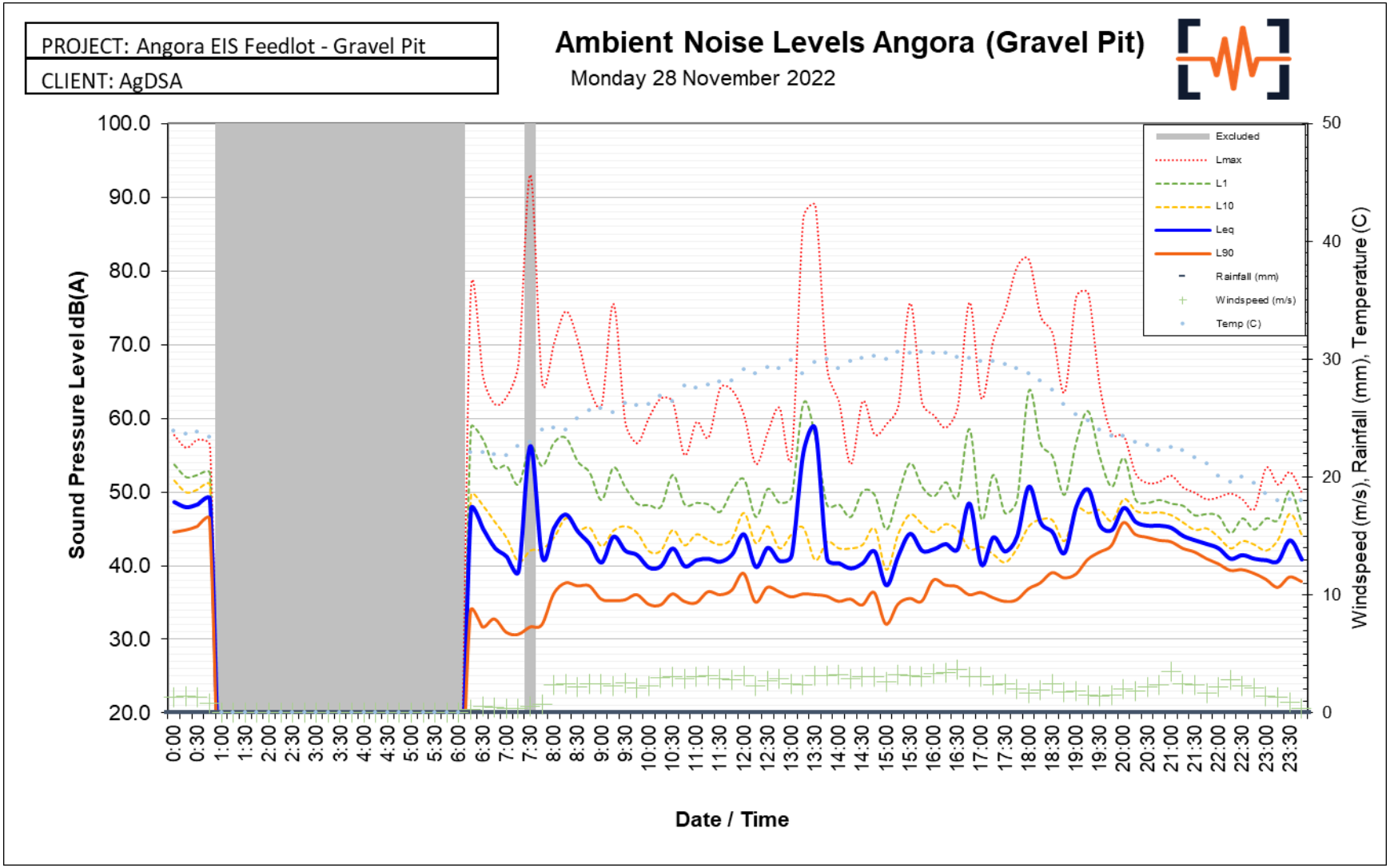
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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Ambient Noise Levels Angora (Gravel Pit)
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Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
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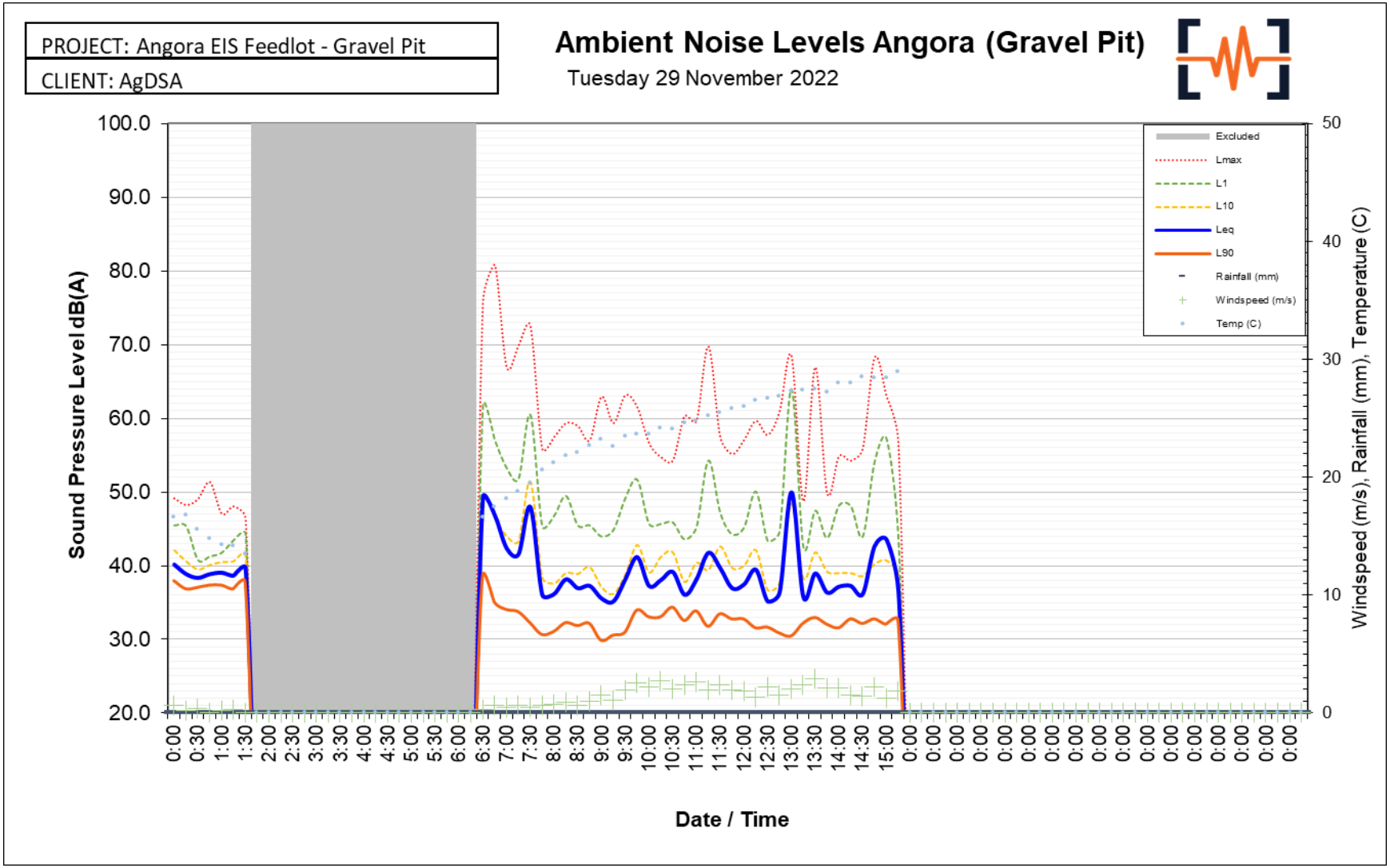
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)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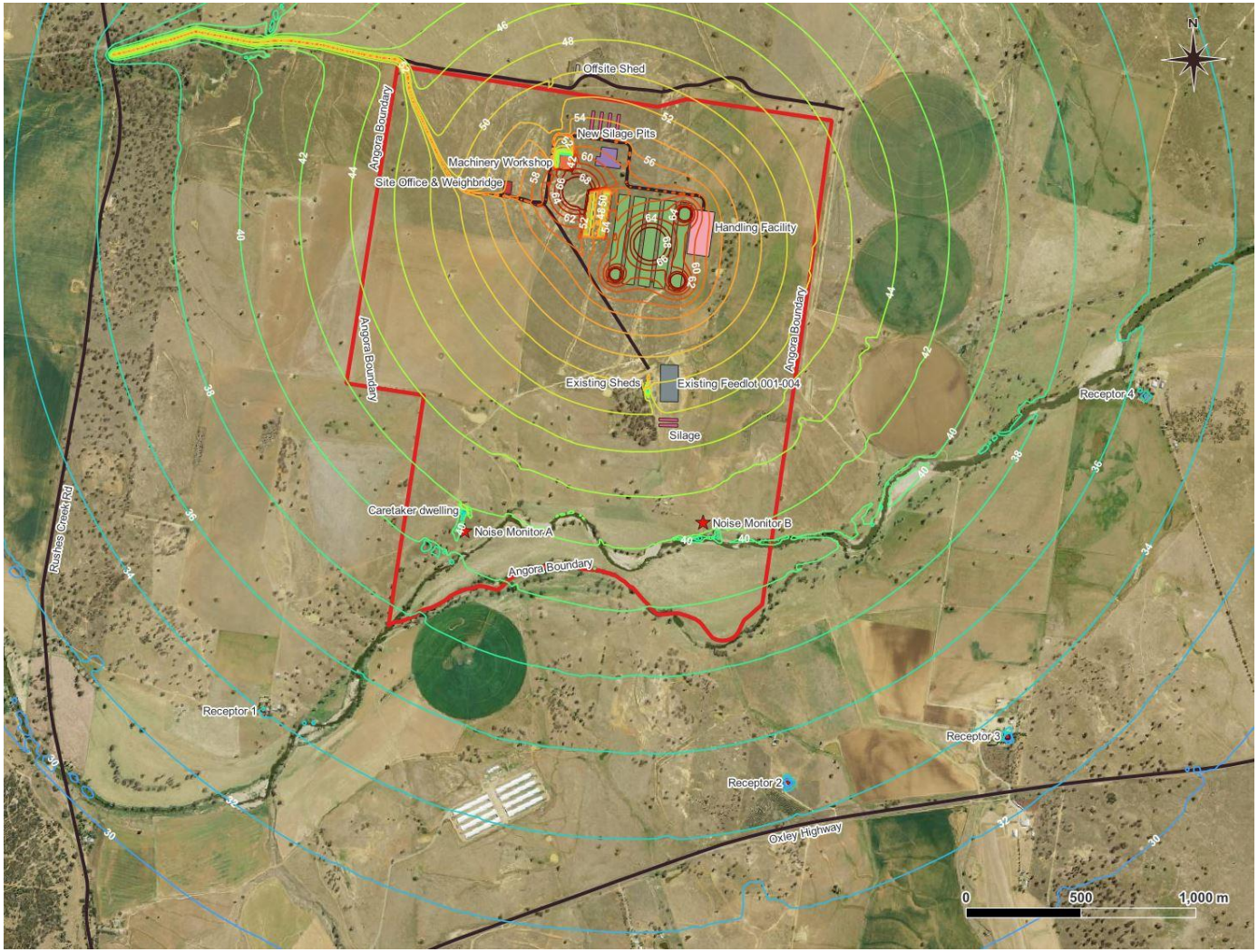
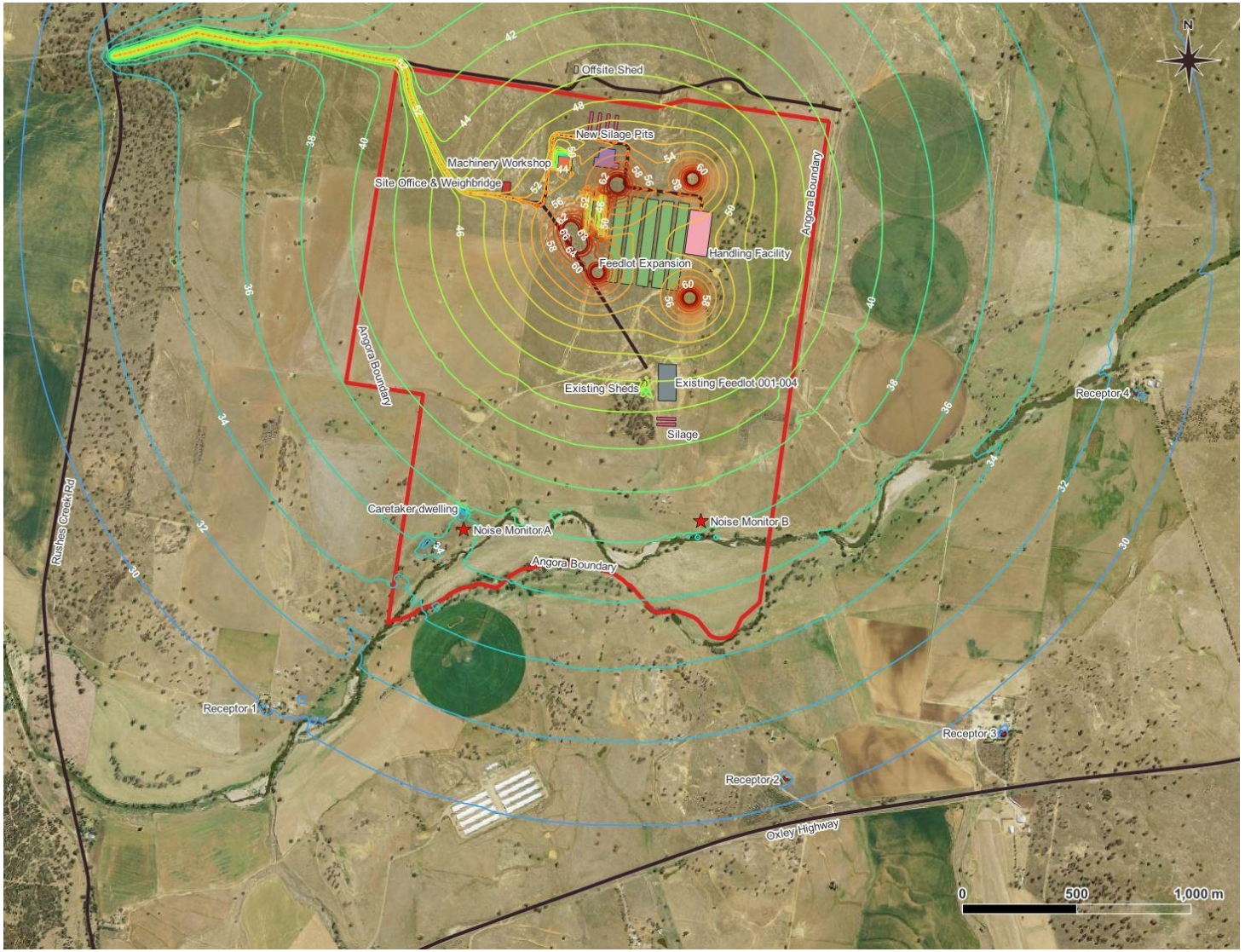
CLIENT: AgDSA
Ambient Noise Levels Angora (Gravel Pit)
Tuesday 29 November 2022
Sound Pressure Level dB(A)
Windspeed (m/s), Rainfall (mm), Temperature (C)
Date / Time
Excluded
Lmax
L1
L10
Leq
L90
Rainfall (mm)
Windspeed (m/s)
Temp (C)

APPENDIX B – NOISE MAPS

Construction Scenario 1: Noise Contour Map



Construction Scenario 2: Noise Contour Map



Full Expansion Angora Feedlot Operations: Noise Contour Map