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APPENDIX A – ACOUSTIC IMPACT ASSESSMENT

Virid Ardent AU (VAAU)

Ridley Clifton Facility Noise Impact Assessment

Document No: 26020027-ANV-RPT-002

Date: 29 July 2026



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Document Information

Document no.	26020027-ANV-RPT-002
Project Name	Noise Impact Assessment
Client Name	Ridley Agriproducts Pty Ltd
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Authorisation

Document Authorisation

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Terms and Abbreviations

Abbreviation	Definition of term
A-weighting	A standard electronic weighting network within a sound level meter, designed to approximate the loudness response of the average human ear to sounds of different frequencies at moderate sound pressure levels.
Ambient noise level	The totally encompassing sound in a given situation at a given time, composed of sound from all sources near and far, measured by the totally encompassing time average A-weighted sound pressure level in a given situation at a given time.
dB / dB(A)	Decibel / A-weighted decibel. A frequency-weighted noise unit that corresponds to the A-weighted response of the human ear and generally correlates with loudness.
Facade affected	A monitoring location which is influenced by facade reflections. Measurements at facades are typically taken at a distance of 1 m away and the measured noise level taken as +2.5 dB higher than 'free field'.
Free field	A monitoring location where the microphone is positioned sufficiently far from nearby surfaces for the measured data to not be influenced by reflected noise.
L ₉₀ , L ₁₀ , etc.	Statistical exceedance levels, where L _N is the sound pressure level exceeded for N% of a given measurement period.
L _{AE} (or SEL)	Sound Exposure Level. This is the constant sound pressure level that has the same amount of energy in one second as the original noise event.
L _{Aeq, T}	The A-weighted equivalent noise level over a time interval (T). It is defined as the steady sound pressure level that contains the same amount of acoustical energy as the corresponding time-varying sound
L _{Amax, T}	The A' weighted maximum sound pressure level of an event over a time interval (T).
Low frequency	Noise containing energy in the low frequency range from 20 Hz to 200 Hz: A unit of frequency equal to one cycle per second.
L _p (or SPL)	Sound Pressure Level
L _w (or SWL)	Sound Power Level
Noise logger	A self-contained, battery powered item of equipment that is used to measure noise levels over several days.
Noise reduction	The difference in sound pressure level between any two areas or building envelope, wall, enclosure or other partition.
NR noise rating	Single number evaluation of the noise level at a location. The noise rating of a given noise is found by plotting the octave-band spectrum on the same diagram and selecting the highest noise rating curve to which the spectrum is tangent. The NR is typically around 5 to 6 dB below the A-weighted noise level.
Octave-band	A frequency band where the highest frequency is twice the lowest frequency.
Offensive noise	Noise that is considered harmful or which interferes unreasonably with affected receptors.
Rating background level (RBL)	The overall single-figure background level representing each assessment period (for example, Standard hours, Non-Standard hours, etc.). RBLs are derived from the noise monitoring results and correspond to the median of the 90 th percentile of the background (L _{A90}) noise levels for each daytime, evening and night period. The recommended RBLs for each of the noise sensitive receptors are based on the dominant land use of each site.
R _w	Weighted Sound Reduction Index of a building element. That is, the laboratory tested (or theoretically calculated) sound insulation performance of a single element.
Sound insulation	A reference to the degree of acoustical separation between any two areas or building elements.

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1 Introduction

Virid Ardent AU (VAAU) has been contracted by Ridley Agriproducts Pty Ltd to undertake Noise Impact Assessment (NIA) for the Clifton feed mill located at 1 Mary Street, Clifton (the Project, Lot 13 on SP162658), in order to assess the noise emissions from the Project's operations.

1.1 Background

A detailed noise impact assessment is required to formulate response to an Information Request (IR) issued by Toowoomba Regional Council dated 20th August 2024 (reference MCUI/2019/1350/E), which requires matters relating to acoustics to be addressed.

The specifics requirement outlined in the IR are as follows:

Information Required:

The application material demonstrates that the site under its current operations does not comply with the existing noise limits. An Amended Noise Impact Assessment is required to be submitted demonstrating compliance and including the following information:

- a) Include the noise compliance criteria as per Condition 44 and show the noise exceedances at receptors in Tables 12, 15 and 16;*
- b) Outline what noise level reductions are required for each of the equipment listed in Table 10 to achieve compliance at receptors; and*
- c) Provide clearly defined timing for upgrades and if applicable, prioritise which land and equipment will be upgraded / replaced first.*

This NIA supplements the previous assessment report (ref 26020027-ANV-RPT-001.00, dated 11/3/2026) with the objective to address IR items (b) & (c) for the IR relating mitigation measures and plan to allow reductions in noise emission from the site operation towards achieving compliance with the relevant criteria.

The understanding of the Project's operational history and approval framework has been informed by publicly available documentation, including:

- MCUI/2019/1350/A (2019 approval documentation);
- MCUI/2019/1350/E (current application documentation);
- Noise Impact Assessment Report prepared by MWA Environmental dated 31st July 2024 (MWA 2024 NIA Report);
- Noise Control Assessment Report prepared by Acoustech dated 8th August 2019 (Acoustech 2019 NCA Report);
- Noise Impact Assessment Report prepared by Acoustech dated 30th October 2019 (Acoustech 2019 NIA Report);

- Approved Document - Noise Reduction Program Year 1 (NRP) prepared by MWA Environmental dated 2nd February 2021 (MWA 2021 NRP); and
- Noise Reduction Program Presentation prepared by Ridley, dated July 2025 (Ridley 2025 NRP Presentation).

The scope of this assessment has been developed based on the following assumptions:

- Current operations and installed plant are consistent with those assessed in the MWA Environmental report dated 31st July 2024, including plant associated with the approved increase in production capacity to up to 1,000 tonnes per day;
- Mitigation measures identified in the approved Noise Control Assessment (2019) and Noise Reduction Program (2021) have been implemented; and
- The increase in production capacity does not materially alter overall site noise emissions relative to those assessed in the approved documentation, subject to implementation of the identified mitigation measures.

This assessment has been prepared based on the information available at the time of reporting and is subject to confirmation of the above assumptions.

1.2 Technical assumptions

Given the extensive history of the project, several assumptions have been made based on available information. While reasonable care has been taken to collate and summarise key information relevant to this assessment from various sources (including Council records and Client-provided data), the accuracy and completeness of this information have not been independently verified.

Accordingly, all information has been assumed to be accurate for the purposes of this report.

1.2.1 Condition of approval - MCUI/2019/1350/A

The approval condition 44 of the MCUI/2019/1350/A dated 3 June 2020, states:

ACOUSTIC AMENITY - NOISE LIMITS

- 44. Except where operating under an approved Noise Reduction Program, noise from activity associated with the use of the subject land must not exceed the Acoustic Quality Objectives listed in Schedule 1 of the Environment Protection (Noise) Policy 2019 when measured at any sensitive receptor.*

1.2.2 Existing ambient noise levels

From the information contained within the approved Acoustech 2019 NIA Report, the baseline noise levels without the operation of Ridley facility are replicated below in Table 1.

Table 1: Existing noise environment (without Ridley facility, Acoustech 2019)

Receptor	RBL, dBA		
	Daytime	Evening	Night-time
Residential receptors	38	34	25

Note: RBL - Rated Background Noise Levels

1.2.3 Heavy vehicles

In relation to the heavy vehicle (HV) movements, an extract from the IR states the following:

Advice: Number of Vehicles

The noise modelling undertaken utilised 2 heavy vehicles per hour for inbound meal and grain trucks and 1 heavy vehicle per hour for outbound products i.e. total of 5 vehicles per hour for 10pm to 5am period.

From our understanding, no further change to the assumptions on HV movements is proposed. Any assessment relating to vehicle movements will be conducted using this movement assumption.

1.2.4 Nearby sensitive receptors

For the purposes of this assessment and in response to the IR, the list of nearby potentially affected receptors presented in the MWA 2024 NIA Report has been adopted and is considered suitable for this assessment. No independent verification of the currency of this information has been undertaken as part of this scope.

Summary of relevant sensitive receptors are presented in Table 2 and locations are presented in Figure 1.

Table 2: Noise sensitive receptors (MWA 2024 NIA Report)

Receptor	Location	Survey plan
R1	3 William Street	RP18287/16
R2	77 Logan Road	RP897826/3
R3	87 Logan Road	RP18287/61
R4	113 Cemetary Road	SP121226/1
R5	4 Clark Street	SP265865/1
R6	28 Catherine Street	RP14850/49
R7	16 Catherine Street	RP14850/44
R8	26 Clark Street	C1855/50
R9	23 King Street	RP172081/2
R10	19 King Street	RP172081/1
R11	8 Centenary Road	C1852/308
R12	41 Logan Roa	RP78100/1
R13	67 Logan Road	RP897826/5
R14	69 Logan Road	RP897826/4

Receptor	Location	Survey plan
R15	81 Logan Road	SP225608/65

2 Project overview

The Clifton feed mill manufactures pelletised animal feed products, primarily supplying poultry farms across Southeast Queensland.

Heavy vehicles access the site from King Street at the northern boundary. A weighbridge located adjacent to the site office along the western boundary is used to weigh inbound raw materials and outbound finished products.

Two enclosed ground receival bays are located in the southern portion of the site, separated for grain and meat meal receival. Deliveries are unloaded within these enclosed bays, which are fitted with exhaust extraction systems. Raw materials are transferred from the underground receival pits via covered screw conveyors and bucket elevators to storage silos prior to processing in the eastern portion of the site.

Milling operations occur within an enclosed processing building and include cleaning, blending, heating, drying and pelletising. The pelletised product is conveyed via enclosed systems to product storage silos located in the northern portion of the site.

Finished product loading occurs via weigh hoppers and discharge chutes into heavy vehicles for dispatch.

2.1 Operation summary

2.1.1 Hours

It is understood that, at the current operating capacity, the project operates 24 hours daily, with the following distinction:

- 5:00 am to 10:00 pm: Standard operation including truck movements; and
- 10:00 pm to 5:00 am: Standard operation excluding truck movements

3 Acoustic criteria and design targets

3.1 Environmental Protection (Noise) Policy 2019

As per the IR, the project operational noise emission criteria are defined in accordance with the Environment Protection (Noise) Policy 2019 (EPP (Noise)), specifically the Schedule 1 Acoustic Quality Objectives (AQOs).

Project operational noise emissions are intended to achieve compliance with the applicable criteria through implementation of a Noise Reduction Program. Target noise levels under the Noise Reduction Program will be established on a progressive basis.

Table 3: EPP (Noise) 2019 AQOs

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

Note 1: The $L_{Aeq,T}$ noise limits apply to all noise sources, whilst the $L_{A10,1hr}$ and $L_{A1,1hr}$ only apply to intermittent noise sources (i.e. excludes air conditioning).

Note 2: Assessment periods Daytime between 7:00 am - 6:00 pm; Evening between 6:00 pm - 10:00 am; Night-time between 10:00 pm - 7:00 am

The AQOs values are indoor (internal level) values for residences during the night-time period. A conservative correction of 7 dB for outdoor to indoor transmission loss is typically applicable to account for attenuation through typical facade constructions in Queensland (Queenslander style dwelling) and dwelling with partially open windows.

3.2 Project specific noise emission criteria

The project-specific criteria in Table 4 have been derived from the EPP (Noise) 2019 AQOs, with adjustments for outdoor assessment and operational characteristics including steady-state fixed plant and intermittent events.

Table 4: Project specific noise emission criteria

Sensitive receptors	Time of day	Project specific criteria, dB(A)	
		$L_{Aeq,adj,1hr}$	L_{Amax}^1
Residence (measured outdoor)	Daytime	50	65
	Evening	42	65
	Night-time	37	47

Note 1: Predicted L_{Amax} noise levels have been used in place of L_{A1} noise levels for assessment purposes. As L_{Amax} represents the maximum predicted event noise level and is generally equal to or greater than the corresponding L_{A1} level for discrete noise events, this approach is considered conservative.

The adopted L_{Amax} criterion of 47 dB(A) is conservative relative to typical sleep disturbance thresholds (~52 dB(A)), however aligns with the derived project-specific outdoor criteria and ensures protection of acoustic amenity at sensitive receptors.

4 Noise monitoring

4.1 Methodology and instrumentation

Operator attended noise measurements were conducted on-site to characterise and quantify site operations, and at the site boundary to assess compliance by an experience and qualified VAAU noise consultant.

The measurements were undertaken on 19th February 2026 and 30th April 2026 in accordance with Australian Standard AS1055:2018 Acoustics - *Description and measurement of environmental noise* and the QLD Department of Environment and Science, *Noise Measurement Manual v4.01*.

All acoustic equipment used in the monitoring program met the standards set by IEC 61672.1-2004 *Electroacoustics - Sound Level Meters - Specifications*. Each device had a valid calibration certificate from NATA or the manufacturer. The list of noise monitoring equipment used throughout the program is shown in Table 5.

Table 5: Instrumentation details

Location	Item	Make / Model	Serial Number	Date of last calibration
All locations	Class 1 Sound level meter	NTi XL2	A2A-25780-E1	01/05/2025
All locations	Acoustic calibrator	Svante SV-36	106881	18/02/2026
All locations	Acoustic camera	Sinus AC100	21163	-

The calibration was checked on-site during setup and decommission. No drift greater than ± 0.5 dB between the pre- and post- measurement calibration check was observed.

The following instrument settings were used for the attended noise measurements:

- 'A' frequency weighting
- 'Fast' time weighting
- 30-second to 5-minute samples for sources characterisation and verification
- 15-minute samples for compliance.

The overall weather conditions during the measurement period were considered suitable for the noise survey. No rain or significant wind (windspeed ≤ 3 m/s) was present during survey period.

4.2 Monitoring results

Noise measurements were conducted at various locations on site for typical activities (nearfield) as well as verification measurements at the boundary of the adjacent sensitive receptors (R1, R5 and R10, see Figure 1).

4.2.1 Sources characterisation

The measured source noise levels were considered to be representative without additional correction. Summary of measured source noise as the calculated sound power levels are presented in Table 8.

4.2.2 Verification measurements

Verification measurements were undertaken at representative locations corresponding to the nearest sensitive receptors surrounding the project site. Measurements at these locations are considered representative of the prevailing ambient noise environment, including contributions from extraneous, non-site-related sources. During the measurements, noise from the project site was not observed to exhibit tonal or impulsive characteristics.

For the purposes of verification, measured noise levels were adjusted to isolate the contribution from site-related sources. These adjusted levels were then extrapolated to the identified sensitive receptors in accordance with the methodology outlined in Section 5.

The verification locations and corresponding noise levels are summarised in Table 6 and shown in Figure 1.

Table 6: Summary of noise levels at the nominated verification location

Location	Measured site contribution $L_{Aeq,15min}^1$ dB(A)
R1 (boundary)	54.6
R5 (boundary)	49.1
R10 (boundary)	47.4

Note 1: The characteristics of fixed plant noise were noted to be steady state. As such the measured $L_{Aeq,15min}$ noise levels can be considered equivalent to $L_{Aeq,1hr}$ respectively.



Figure 1: Receptor and verification locations

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5 Noise modelling and noise level calculation

5.1 Standards and calculation algorithm

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

The model considered noise sources, receptors and the effect of distance, ground topography, atmospheric attenuation, and obstacles such as barriers and buildings. To predict noise emissions, SoundPLAN implements the international standard ISO9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation*.

5.2 Calculation parameters and assumptions

The noise modelling parameters used in the SoundPLAN model are listed in Table 7 below.

Table 7: Summary of noise modelling parameters and assumptions

Modelling input	Source
Digital Ground Model (DGM)	2019 1m LiDAR elevation data, Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (via QSpatial)
SoundPLAN calculation algorithm	ISO9613-2:1996
Point receptor height	1.5 m above ground
Grid noise map height	1.5 m above ground
Façade reflection	Included in the calculation
Ground absorption coefficient	0 for hard surfaces such as hardstands 0.6 for general residential areas
Noise contour resolution	5 m grid
Calculation tolerance	±0.1 dBA

5.3 Noise sources

The noise sources include a combination of various aspects of the project site. The noise levels for each plant equipment were quantified based on, on site measurements, and MWA 2024 NIA Report. Summary of the plant sound power levels utilised in the model are detailed in Table 8.

Table 8: Source sound power levels

Source / Plant	Source type	Source height (m)	Average Sound Power level dB(A) ⁴	
			L _{Aeq}	L _{Amax}
Boiler house ¹	Industrial Building	As per drawing	65 per m ²	70
Compressor shed ¹	Industrial Building	As per drawing	66 per m ²	71

Source / Plant	Source type	Source height (m)	Average Sound Power level dB(A) ⁴	
			L _{Aeq}	L _{Amax}
Grain dust extractor ¹	Industrial Building	As per drawing	73 per m ²	75
Grain intake shed ¹	Industrial Building	As per drawing	57 per m ²	60
Meal dust extractor ¹	Industrial Building	As per drawing	73 per m ²	75
Meal intake shed ¹	Industrial Building	As per drawing	58 per m ²	70
Mill ¹	Industrial Building	As per drawing	64 per m ²	69
Warehouse ³	Industrial Building	As per drawing	52 per m ²	57
Truck movement ²	Line source	3	66 per m	103
Condenser fan ¹	Point source	1	96	101
Grain intake tower motor ³	Point source	29	77	81
Grain transfer elevator ¹	Point source	1	77	82
Meal auger ¹	Point source	1	76	81
Meal intake tower motor ³	Point source	29	77	81
Outload roof fans ²	Point source	20	100	105
Roof cyclone fan ²	Point source	29	105	110
Silo hopper ¹	Point source	5	80	85
Truck dumping at intake shed ¹	Point source	0.5	80	115
Truck idling ¹	Point source	3	97	116

Note 1: Site measurements.

Note 2: MWA 2024 NIA Report.

Note 3: Estimated based on measurement of similar equipment on site.

Note 4: Average noise levels are applicable to industrial buildings where different façades may emit varying noise levels due to building construction and the location of internal plant equipment.

5.4 Modelling scenario

Three (3) operational scenarios (including the verification operating scenario) were developed based on onsite observations and previous assessment report (MWA 2024 NIA Report) for consistency.

Table 9: Summary of modelling scenario

Scenario ref	Scenario description
S00	Model verification scenario: fixed plant only
S01	Current peak hour operations: up to 4 intake movements (2 meal trucks and 2 grain trucks) and 1 outloading movement (1 truck) per hour
S02	Proposed peak hour operations: up to 8 intake movements (e.g. 4 meal trucks and 4 grain trucks) and 2 outloading movement (2 trucks) per hour

Summary of plant equipment associated with the established scenarios are presented in Table 10.

Table 10: Modelling scenario plant equipment

Source / Plant	Scenario and number of sources per hour		
	S00	S01	S02
Boiler house	1	1	1
Compressor shed	1	1	1
Grain dust extractor	1	1	1
Grain intake shed	1	1	1
Meal dust extractor	1	1	1
Meal intake shed	1	1	1
Mill	1	1	1
Warehouse	1	1	1
Truck movement	-	5	8
Condenser fan	1	1	1
Grain intake tower motor	1	1	1
Grain transfer elevator	1	1	1
Meal auger	1	1	1
Meal intake tower motor	1	1	1
Outload roof fans	1	1	1
Roof cyclone fan	2	2	2
Silo hopper	-	1	-
Truck dumping at intake shed	-	5	8
Truck idling	-	5	8

5.5 Model validation

Typical site operations involving fixed plant forms the operational scenario of the verification modelled as per the methodology detailed in Sections 5.3 and Section 5.4.

Predicted noise levels at the verification locations are detailed in Table 11 and Appendix C. The noise sources and the verification locations are shown in Figure 1.

Table 11: Verification of the noise model

Location	Site contribution noise level L_{Aeq} , dB(A)		
	Measured	Predicted	Difference
R1 (boundary)	54.6	54.2	-0.4
R5 (boundary)	49.1	49.5	+0.4
R10 (boundary)	47.4	48.4	+1.0
Average			+0.3

A comparison between the measured and predicted noise levels shows that the noise model overpredicts noise emissions by 0.3 dB(A) on average. This level of variance is considered conservative and within the acceptable error margin of ± 2.0 dB(A).

The noise model is considered suitable for comparative assessment and compliance evaluation, subject to the stated assumptions.

5.6 Predicted noise levels at the receptors

The predicted noise levels at the potentially most affected façade of the nearest residential receptors to the south of the project site are shown in Table 12. This modelling scenario includes the typical operations within a 1-hour period as per the verification of the model, current peak hour operation (5 truck movements), and proposed peak hour with increase capacity (10 truck movements).

The overall noise sources and the surrounding receptors are shown in Figure 2.

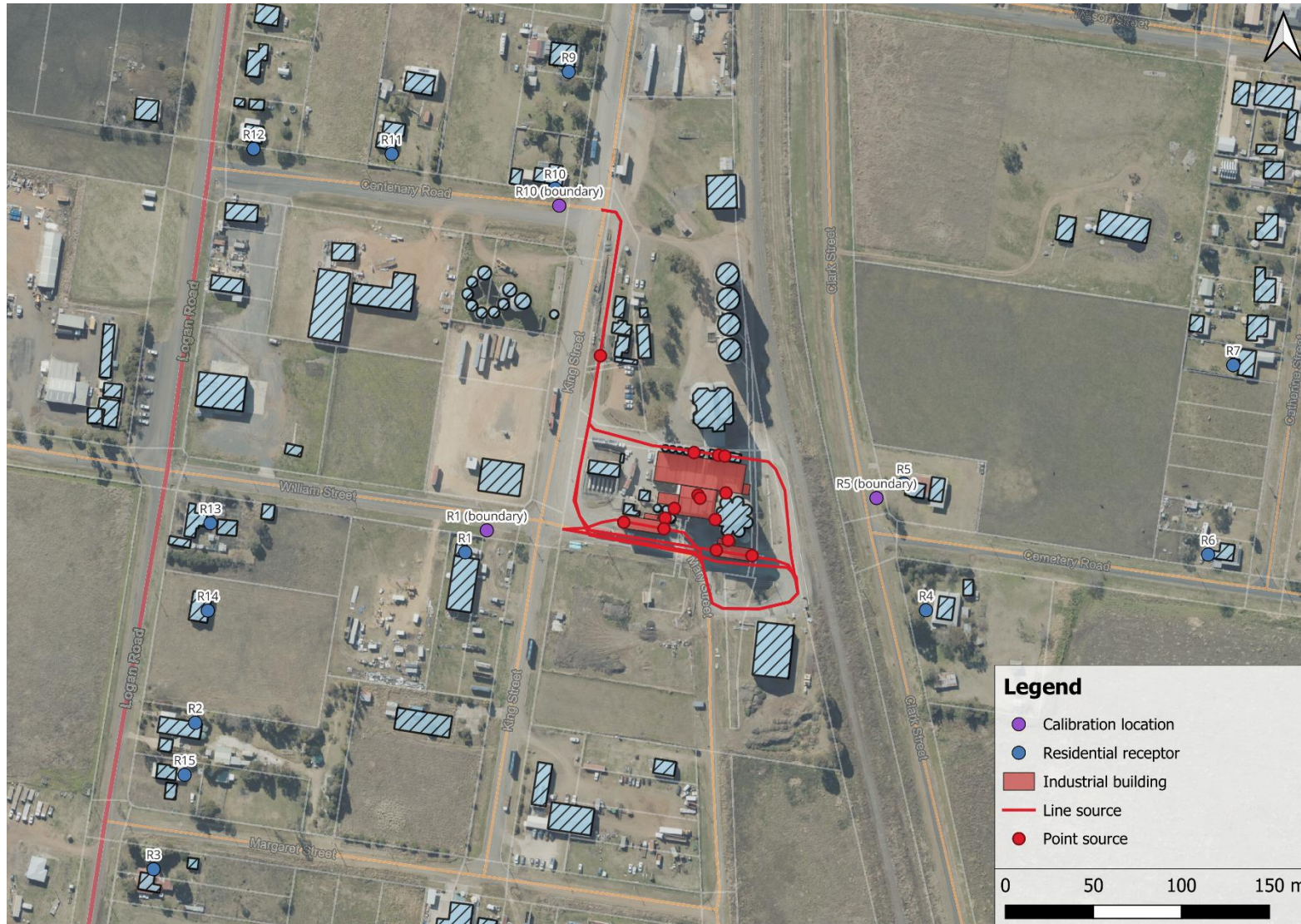


Figure 2: Overall source locations (S01 & S02)

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Table 12: Project noise emission assessment

Descriptor	Predicted noise levels ^{1,2}					
	dB(A) $L_{Aeq, 1hr}$			dB(A) L_{Amax}		
Scenario	S00	S01	S02	S00	S01	S02
Period	N	D/E	D/E	N	D/E	D/E
Criteria	37	50/42	50/42	47	65	65
R1	56	58	60	50	72	72
R2	47	48	49	46	55	55
R3	46	47	49	44	59	59
R4	58	60	62	49	73	73
R5	51	55	57	50	71	71
R6	44	47	48	43	61	61
R7	45	47	48	46	60	60
R8	40	45	47	41	61	61
R9	47	51	53	47	63	63
R10	50	55	58	49	67	67
R11	47	50	52	47	61	61
R12	46	47	49	45	56	56
R13	44	48	50	44	59	59
R14	48	50	51	46	59	59
R15	47	48	49	45	57	57

Note 1: Predicted noise levels that exceed the most stringent applicable criteria for each period are presented in **bold**.

Note 2: the predicted noise levels include façade reflected calculation

6 Discussion

The assessment of noise impact based on the predicted noise levels indicates exceedances of the AQO night-time criteria at all receptor locations under Scenario S00. Exceedances during the evening period are also predicted at all receptor locations under Scenarios S01 and S02, noting that the evening criterion is the more stringent criterion for the daytime/evening assessment period.

When assessed against the daytime criterion, exceedances of the predicted $L_{Aeq, 1hr}$ noise levels are identified at receptors R1, R4, R5, R9 and R10 under Scenario S01, and at receptors R1, R4, R5, R9, R10, R11 and R14 under Scenario S02.

For the predicted L_{Amax} noise levels, exceedances of the night-time criterion are predicted at receptors R1, R4, R5 and R10 under Scenario S00. Exceedances of the daytime/evening L_{Amax} criterion are also predicted at receptors R1, R4, R5 and R10 under both Scenarios S01 and S02.

6.1 Noise reduction program

As part of the noise reduction program, it is understood that several noise control measures have been implemented for the project site. Summary of the mitigation measures which have been applied to date are presented in Table 13.

Table 13: Applied mitigation measures to date February 2026

Area	Mitigation detail
Truck and Vehicle Management Measures	• Pavement upgrades and implementation of a 10 km/h site speed limit for all vehicles. • Management of truck idling, including limiting engine operation while stationary. • Use of temporary noise barriers for stationary vehicles where required. • Operational controls to manage heavy vehicle movements and unloading activities.
Fixed Plant and Building Mitigation Measures	• Intake and Dust Extraction Systems • Installation of rapid roller doors to intake buildings (closed during unloading where practicable). • Modification of dust extraction controls so units operate only during active unloading and shut down once transfer is complete. • Installation of new external dust collector (5FN40). • Installation of cyclone fan silencer on roof of mill building
Material Handling Equipment	• Replacement and/or upgrade of discharge screws, elevators (E5, E6), screw conveyors (SC12), and drag conveyor (DC42).
Hammer Mill	• Upgraded southern doors (minimum STL 25 dB). • Installation of acoustic louvres (minimum insertion loss 20 dB). • Internal lining of lower deck sheet metal façade with insulation (minimum insertion loss 25 dB). • Infill of upper deck areas and sealing of façade gaps around louvres and doors. • Upgrade of hammer mill cyclone fan and installation of high-level noise attenuators.
Boiler House	• Upgrade of open louvre vents with acoustic louvres (minimum insertion loss 10 dB). • Internal lining of sheet metal cladding with insulation and/or flexible acoustic barrier material (minimum insertion loss 20 dB). • Installation of acoustic curtain system to internal walls. • Provision for airflow via treated acoustic louvres and vent cut-outs.

Area	Mitigation detail
Compressor Room	- Lining of mesh walls with flexible acoustic barrier material (minimum insertion loss 20 dB). - Replacement of enclosure with solid structure (minimum $R_w 15$) The inclusion of acoustic wall lining had significantly reduced the airflow into the compressor room causing the existing compressor to fail. At the time of this survey, a temporary (loan) compressor was in operation and compressor room had partial lining at low level (approximately up to 2.5m high) to allow adequate airflow for the operation of the compressor. It is understood that the new compressor will be similar to the loan unit. The measured noise levels may differ from the final enclosure design intent.

To assess the effectiveness of the noise reduction program, the current calculated noise levels, including the mitigation measures listed in Table 13, have been compared against the original noise levels at the nominated reference locations. The comparison is presented in Table 14.

Table 14: 2019 and 2026 noise level comparison

Scenario ref	Operating Condition	Predicted noise levels at nominated location, dB(A) $L_{Aeq,1hr}$		
		R1 ²	R5 ² (R2) ¹	R10 ² (R1) ¹
OGS00	2019 Unmitigated - initial noise level ¹	~63	56	56
S01	2026 Peak hour operation (with truck)	58	55	55
Change relative to 2019 unmitigated level		-5	-1	-1

Note 1: Acoustech 2019 NCA Report, estimated from noise contour

The results indicate that, when compared with the original unmitigated noise levels reported in the Acoustech 2019 NCA Report, the current predicted noise levels are reduced by up to 5 dB(A) at the nominated assessment locations. Smaller reductions of approximately 1 dB(A) are predicted at R5 and R10.

It is noted that the 2026 current operation scenario includes truck movements and therefore represents the overall site noise contribution at the receptor locations, rather than fixed plant noise only. Accordingly, the receptor-level reductions shown in Table 14 are not directly equivalent to the nominal source-level reductions identified for individual fixed plant items under the noise reduction program documentation.

6.2 Noise reduction targets

Based on the information contained within the MWA 2021 NRP and the Acoustech 2019 NCA Report, it is understood that the noise reduction program anticipated a reduction in noise emissions following implementation of the nominated mitigation measures.

The Acoustech 2019 NCA Report identifies a nominal reduction of approximately 10 dB(A) to 15 dB(A) for fixed plant noise. Similarly, the Ridley 2025 NRP Presentation refers to an expected fixed plant noise reduction of approximately 10 dB(A) to 15 dB(A), as referenced in the MWA 2021 NRP.

Although the NRP anticipated source-level reductions of 10-15 dB(A), the realised reductions at receptors are lower due to cumulative contributions from multiple sources and residual unmitigated pathways. The detailed mitigation strategy and source-specific implications are addressed in Section 7.

7 Recommendation

7.1 Source contribution review

A source contribution review was undertaken for the fixed plant noise scenario to identify the dominant contributors at each receptor location. The detailed source contribution outputs are provided in Appendix A.

The review indicates that fixed plant noise emissions are not dominated by a single source at all receptor locations. Roof-level plant, particularly the roof cyclone fans, is a consistent contributor across most receptor locations. This is consistent with the elevated location of these sources and the reduced effectiveness of shielding from intervening buildings and site structures.

At the more affected receptors, particularly R1 and R4, the predicted noise levels are also materially influenced by building breakout noise from the mill building, boiler house, grain intake, warehouse, meal intake and associated dust extraction systems. These receptors are therefore not solely controlled by roof-level plant noise.

The source contribution pattern can be broadly summarised in Table 15.

Table 15: Summary of source contribution pattern

Receptor group	Dominant contribution trend
R1 and R4	Strongly influenced by building breakout from the mill building, boiler house, grain intake, warehouse, meal intake and dust extraction systems, in addition to roof-level plant.
R5 to R9 and R11 to R15	More consistently influenced by roof-level plant, including roof cyclone fans and outload roof fans, with secondary contributions from broader mill building emissions.
R10 to R12	Mixed influence, with roof cyclone fans remaining important, but with material contributions from the mill building, boiler house and warehouse.

The results indicate that the exceedance pattern is driven by a combination of elevated point sources and building breakout noise. The elevated point sources include the roof cyclone fans, outload roof fans and large condenser fan. The building breakout sources include the mill building, boiler house, grain intake, warehouse and associated intake or dust extraction systems.

Accordingly, effective mitigation is likely to require a combination of roof-level plant noise control and targeted treatment of dominant building breakout paths, rather than reliance on a single source treatment measure.

Based on the source contribution ranking, the likely practical mitigation hierarchy is outlined in Table 16.

Table 16: Preliminary mitigation hierarchy

Source	Impact
Roof cyclone fans	Will provide the broadest potential site-wide benefit.
Mill building breakout	Will provide reduction to several receptors including R1, R4 and R10.
Boiler house breakout	Will provide reduction to several receptors including R1, R10, R12 and R14.
Grain intake and grain dust extraction systems	Will provide reduction to particularly R4 to R7.
Outload roof fans and the large condenser fan	Secondary sources, but recurring contributors across multiple receptors.

7.2 Mitigation measures

Potential noise mitigation measures were reviewed with consideration of mitigation at the source, along the propagation path and, where necessary, at the receptor. In general, mitigation at the source is preferred, as it provides the greatest potential to reduce emissions across multiple receptor locations and is less dependent on site layout or third-party access.

The detailed mitigation strategy has been developed having regard to the source contribution review in Section 7.1. In summary, compliance is expected to require coordinated treatment across multiple source groups rather than reliance on a single mitigation measure.

The Ridley 2025 NRP presentation identifies a number of mitigation measures that are consistent with the mitigation hierarchy recommended in this assessment, including cyclone fan silencing, hammer mill / mill building envelope upgrades, boiler house acoustic treatment, compressor room enclosure works, truck speed/idling controls, intake shed roller doors and dust extraction control changes. These measures indicate that several of the recommended mitigation pathways have either been implemented, proposed, or partially addressed.

However, the current source contribution results indicate that further review is required to confirm the effectiveness of these measures and identify remaining dominant breakout paths. In particular, roof cyclone fans, mill building breakout, boiler house breakout, grain/meal intake shed openings, outload roof fans and truck circulation remain relevant contributors under the current assessment. Where previous mitigation has already been installed, the next step should be verification of installed

performance and targeted upgrade of any remaining weak points, rather than assuming the original nominated reduction has been achieved.

A summary of potential mitigation measures is presented in Table 17.

Table 17: Potential mitigation measures

Mitigation category	Potential measures	Comments
Source treatment – roof-level plant	Acoustic silencers, attenuators, fan replacement, fan speed control, acoustic lagging to ductwork, or localised enclosures around dominant roof plant.	Expected to provide broad benefit, particularly where roof cyclone fans, outload roof fans and other elevated plant dominate.
Source treatment – building breakout	Building envelope and roof upgrades, sealing of façade gaps and penetrations, treatment of doors, louvres, ventilation openings and other weak points in the building fabric.	Relevant to the mill building, boiler house, grain intake, warehouse, meal intake and dust extraction systems. Internal plant treatment should only be considered where envelope upgrades alone are insufficient.
Operational controls	Management of plant operating schedules, limiting simultaneous operation of dominant items where practicable, maintenance of fans/motors, and control of truck idling or unloading procedures.	May provide supplementary reduction but is unlikely to be sufficient as a standalone measure where fixed plant noise dominates.
Path treatment	Localised barriers, screens or shielding between dominant sources and affected receptors.	May be effective for lower-level sources, but less effective for elevated roof-level plant unless designed with sufficient height and extent.
Receptor treatment	Architectural acoustic treatment at affected dwellings, subject to access and agreement.	Generally considered a last-resort or supplementary measure where source and path mitigation is not practicable or cannot fully achieve the required reduction.

Further mitigation should prioritise the dominant common sources identified in Section 7.1. The specific treatment pathways for these source groups are summarised in Table 17.

7.3 Required noise reductions and mitigation staging

The source contribution review has been used to identify the dominant contributors requiring further mitigation. The required noise reductions are receptor-dependent and cannot be attributed to a single source in isolation, as compliance is governed by the combined contribution of multiple sources.

Accordingly, preliminary required source reduction targets have been developed for each relevant equipment/source group listed in Table 10. The targets are intended to guide mitigation design and prioritisation, with priority given to sources that contribute materially across multiple receptors and are expected to provide the greatest overall noise reduction benefit.

For building source groups, the preferred mitigation approach is to reduce noise breakout through the external building envelope rather than treating internal plant directly. This may include sealing gaps, upgrading wall and roof elements, improving doors and louvres, treating ventilation openings, and addressing roof penetrations or other weak points in the building fabric.

The mitigation staging reflects the source priorities and treatment pathways described in Sections 7.1 and Section 7.2. Stage 1 works should focus on the highest-priority common contributors, with later stages addressing secondary sources and residual exceedance pathways confirmed by updated modelling.

Individual source reduction targets are not intended to independently achieve compliance; rather, cumulative reductions across multiple sources are required.

A summary of the required source reduction targets and proposed mitigation staging is presented in Table 18.

Table 18: Noise reductions and mitigation staging

Priority	Source / equipment group	Status relative to Ridley 2025 NRP	Proposed mitigation pathway	Preliminary source noise reduction target ¹	Timing / staging
1	Roof cyclone fans	Yes / partially New fan silencer is noted on the document	Review the installed cyclone fan silencer performance. Where required, optimise or upgrade silencers/attenuators, treat associated ductwork, review fan speed control, fan replacement or localised acoustic enclosure options.	15-20 dB	Stage 1 - immediate design review and implementation within 3-6 months
2	Mill building	Yes / partially Hammer mill façade, louvre, door and gap treatments identified; equipment replacement also noted.	Building envelope treatment, including sealing façade gaps, upgrading wall and roof elements, improving doors/louvres, treating ventilation openings, and sealing penetrations. Apply automatic closing doors by providing acoustically treated ventilation paths		Stage 1 / Stage 2 - design within 3 months, implementation within 6-12 months
3	Grain intake shed / meal intake shed	Yes / partially Rapid roller doors and dust extraction controls identified, but full enclosure during unloading is not addressed.	See section 7.3.1 Swept path constraint roller door closure not practical. Extend shed footprint or provide acoustic vestibule/portal extensions to allow trucks to be fully enclosed and access doors closed during unloading. Supplementary works may include upgraded automatic acoustic roller doors, sealing of non-essential gaps, roof/wall upgrades, absorptive internal lining and treatment of ventilation/dust extraction openings.		Stage 2 / Stage 3, subject to feasibility, operational constraints and approvals

Priority	Source / equipment group	Status relative to Ridley 2025 NRP	Proposed mitigation pathway	Preliminary source noise reduction target ¹	Timing / staging
4	Boiler house	Yes / partially - Louvre upgrade - Increased surface mass treatment to walls	Building envelope treatment, acoustic, sealing gaps, treating remaining ventilation paths, upgrading wall/roof elements and improving treatment to all openings.	10-15 dB	Stage 2 - implementation within 6-12 months
5	Outload roof fans	Not specifically identified in Ridley 2025 NRP	Silencers, attenuators, fan replacement, speed control, acoustic cowls or localised enclosures.		Stage 2 - implementation within 6-12 months
6	Dust extraction equipment for intake pits	Yes / partially Operational control	Envelope and breakout treatment associated with the dust extraction system, including treatment of duct penetrations, discharge paths, roof/wall/door breakout.		Stage 2 - implementation within 6-12 months
7	Warehouse	Not specifically identified	Building envelope treatment, including sealing openings, upgrading wall/roof elements, improving roller doors or other openings, and treating façade/roof breakout paths.	5-15 dB	Stage 3 - implementation within 12-18 months
8	Large condenser fan	Not specifically identified	Fan speed control, lower-noise fan selection, acoustic screen, discharge attenuator or localised enclosure subject to airflow requirements.		Stage 3 - implementation within 12-18 months
9	Compressor shed	Yes / partially Increased surface mass treatment to walls	Subject to final compressor installation - Confirm final compressor enclosure design, with focus on external envelope performance, ventilation treatment, acoustic louvres/openings and sealing, while maintaining required airflow.		Stage 1 for design confirmation; implementation dependent on permanent compressor installation

Priority	Source / equipment group	Status relative to Ridley 2025 NRP	Proposed mitigation pathway	Preliminary source noise reduction target ¹	Timing / staging
10	Grain intake tower motor / meal intake tower motor / grain transfer elevator / meal auger	Not specifically identified	Maintain plant in good working order, check vibration isolation, and review local shielding or enclosure only if confirmed as a material contributor during detailed design.	0-5 dB initially	Ongoing / Stage 3
11	Silo hopper	Not specifically identified	Maintain plant in good working order, check vibration isolation, and review local shielding or enclosure only if confirmed as a material contributor during detailed design.		Ongoing / Stage 3
12	Truck movements, truck dumping and truck idling	Yes / partially • Pavement upgrades. • Speed limit • - minimise idling activity	See Section 7.3.2 Truck idling and site-related circulation were observed at various locations, including movements associated with weighbridge access and queuing. Maintain speed limits, minimise idling, manage unloading procedures, use temporary barriers where practicable, and review unloading bay door management, designate truck waiting bay.	5-10 dB event reduction where practicable	Immediate and ongoing operational control

Note 1: The reduction targets are preliminary design targets intended to guide mitigation prioritisation. The final required reduction for each source is receptor-dependent and governed by the combined contribution of multiple sources. The final mitigation package should therefore be confirmed through updated source-specific mitigation modelling prior to implementation.

7.3.1 Grain intake shed / Meal intake shed

As the east and west openings of the grain and meal intake sheds are required for truck access, the ability to achieve significant noise reduction through conventional door closure is limited under the current shed configuration. A more effective long-term mitigation option would be to extend the shed footprint or provide acoustic vestibule/portal extensions so that trucks can be fully contained within the shed during unloading, allowing access doors to be closed during the noise-generating activity.

This approach would reduce direct noise breakout through the truck access openings and improve the effectiveness of building envelope treatments. The feasibility of this option would need to be confirmed with regard to truck swept paths, operational workflow, ventilation, dust extraction, fire safety, structural requirements, stormwater, site constraints and any planning/building approval requirements.

Where the shed openings remain open during unloading, achievable noise reduction may be limited by direct line-of-sight breakout through the truck access paths. Extending the shed footprint to fully contain vehicles during unloading would provide a more robust mitigation pathway, as it allows the shed envelope and access doors to function as part of the acoustic control system.

7.3.2 Truck movements

Truck movements have not been specifically addressed as part of the fixed plant source reduction assessment. However, during site observations, heavy vehicles associated with site operations were observed to use the adjoining public road network as part of the operational circulation route.

For example, outloading trucks were observed to enter the site via the southern gate, travel directly to the silo loading area for product loading, then exit the site and re-enter via the weighbridge before leaving the facility. This indicates that some operational truck movements occur across both the site and the immediately adjoining public roadway as part of the overall loading and dispatch process.

While these movements are not fixed plant sources, they may contribute to short-duration noise events, including engine noise, acceleration, braking, low-speed pass-bys, idling and loading-related activity. These movements are therefore relevant to the overall operational noise environment, particularly for L_{Amax} and peak-hour assessment scenarios.

Potential management measures for truck movements are summarised in Table 19.

Table 19: Potential truck operational management controls

Item	Potential management measure
Site access and routing	Review truck circulation to minimise unnecessary movements on public roads where practicable.
Speed control	Maintain low-speed operation within the site and near sensitive receptors.
Idling control	Minimise truck idling during queuing, loading, weighing and dispatch activities.
Loading procedures	Manage loading activities to reduce impact noise, engine revving and avoidable short-duration noise events.

Item	Potential management measure
Scheduling	Where practicable, limit the noisiest heavy vehicle movements during the most sensitive periods.
Driver management	Provide driver instructions regarding low-noise operation, including avoiding unnecessary engine braking, horn use and idling.
Physical controls	Consider localised screening or acoustic barriers where trucks are stationary for extended periods, subject to sightline, safety and operational requirements.

The above measures should be incorporated into the operational noise management procedures for the facility. Where truck movements remain a material contributor to exceedances, further assessment may be required to quantify the noise contribution from public-road circulation associated with the site and determine whether additional operational or route-management controls are warranted.

8 Conclusion

Virid Ardent AU has undertaken a Noise Impact Assessment for the Ridley Clifton facility to address the acoustic matters raised in Council's Information Request, including the applicable noise criteria, predicted exceedances, required source noise reductions and proposed mitigation staging.

The assessment adopted the receptors from the MWA 2024 NIA Report and assessed operational noise emissions against project-specific criteria derived from Condition 44 and the Schedule 1 Acoustic Quality Objectives of the Environmental Protection (Noise) Policy 2019.

Operator-attended measurements were undertaken in February and April 2026 to characterise current site operations and verify the noise model. The verified model was used to assess fixed plant only operation, current peak-hour operation with truck movements, and proposed peak-hour operation with increased truck movements.

The results indicate that the site does not currently demonstrate compliance with the adopted criteria under all assessed scenarios. Exceedances are predicted at a number of residential receptors, including night-time fixed plant exceedances and daytime/evening exceedances under the current and proposed peak-hour operating scenarios.

The source contribution review indicates that the exceedances are not controlled by a single source. Roof-level plant, particularly the roof cyclone fans, is a consistent contributor across multiple receptors. At the more affected receptors, predicted noise levels are also materially influenced by building breakout from the mill building, boiler house, grain intake, warehouse, meal intake and associated dust extraction systems.

Further mitigation is therefore required. The proposed staged mitigation plan prioritises roof-level plant, followed by targeted building envelope and roof treatments to reduce noise breakout from dominant building sources. Truck movements should also continue to be managed through operational controls, including routing, speed management, idling controls and loading procedures.

Final mitigation requirements should be confirmed through detailed mitigation design, updated noise modelling and post-implementation verification monitoring.

Appendix A. Fixed plant source contribution summary by receptor

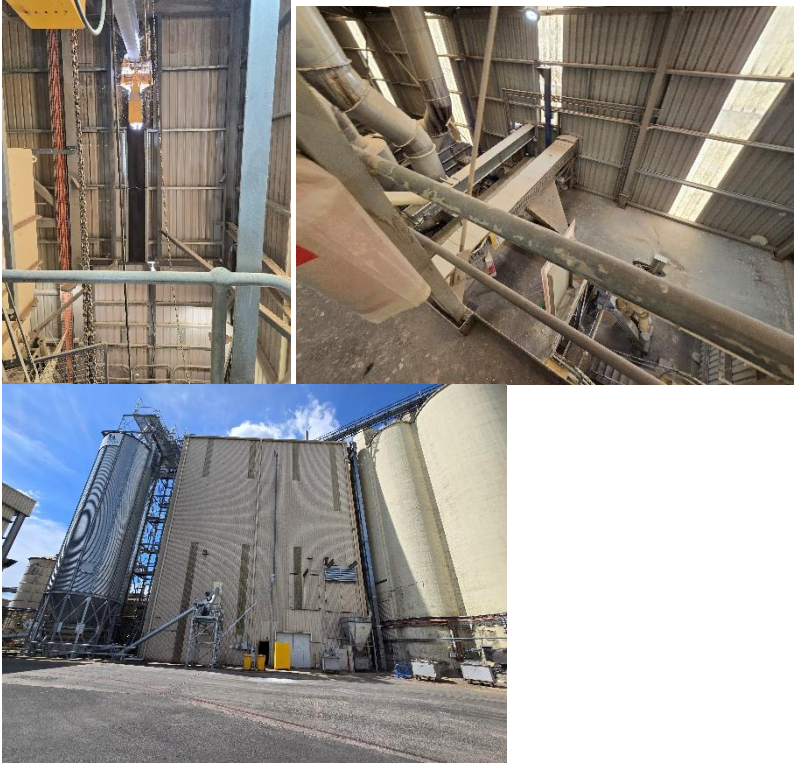
Receptor	Consolidated source	Predicted contribution (S00), dB(A) $L_{Aeq,1hr}$
R1	Boiler house	50
	Mill building	49
	Roof cyclone fans	48
	Grain intake	45
	Warehouse	44
	Outload roof fans	43
R2	Roof cyclone fans	44
	Mill building	40
	Boiler house	38
	Grain intake	38
	Outload roof fans	36
	Warehouse	29
R3	Roof cyclone fans	42
	Mill building	39
	Boiler house	36
	Outload roof fans	34
	Grain intake	34
	Warehouse	31
R4	Mill building	54
	Grain intake	53
	Roof cyclone fans	47
	Meal intake	44
	Grain dust extractor	44
	Boiler house	40
R5	Roof cyclone fans	47
	Outload roof fans	43
	Mill building	43
	Grain dust extractor	41
	Large condenser fan	38
	Grain intake	38
R6	Roof cyclone fans	40
	Large condenser fan	38
	Outload roof fans	37
	Mill building	33
	Grain dust extractor	33
	Grain intake	29
R7	Roof cyclone fans	44
	Outload roof fans	37

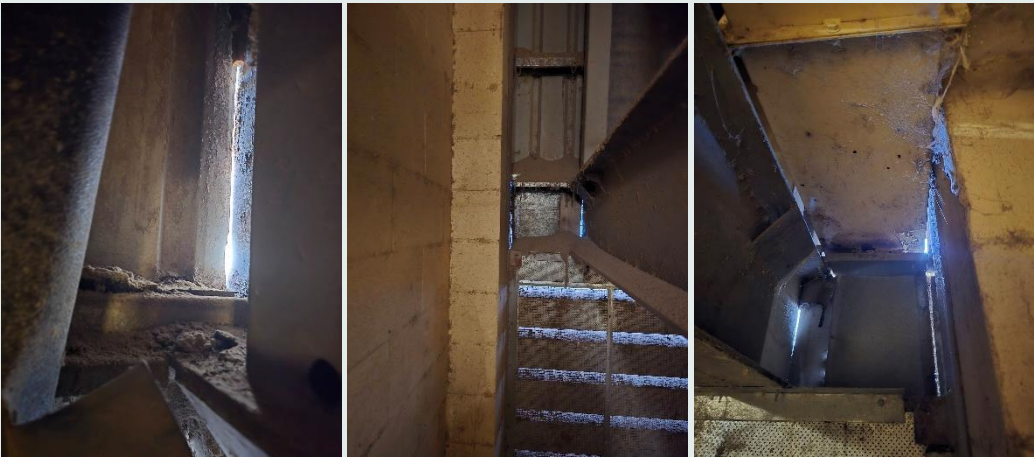
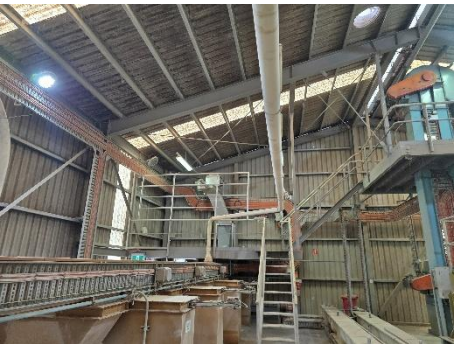
Receptor	Consolidated source	Predicted contribution (S00), dB(A) $L_{Aeq,1hr}$
	Mill building	33
	Grain dust extractor	31
	Compressor shed	27
	Grain intake	26
R8	Roof cyclone fans	39
	Outload roof fans	32
	Mill building	28
	Compressor shed	24
	Grain intake	21
	Boiler house	21
R9	Roof cyclone fans	45
	Mill building	37
	Outload roof fans	35
	Boiler house	35
	Warehouse	35
	Meal dust extractor	30
R10	Roof cyclone fans	47
	Mill building	42
	Boiler house	40
	Warehouse	36
	Outload roof fans	36
	Meal dust extractor	36
R11	Roof cyclone fans	45
	Mill building	38
	Outload roof fans	36
	Boiler house	35
	Warehouse	30
	Meal intake	25
R12	Roof cyclone fans	43
	Mill building	38
	Boiler house	38
	Outload roof fans	36
	Warehouse	33
	Grain intake	26
R13	Roof cyclone fans	42
	Mill building	37
	Grain intake	33
	Outload roof fans	32
	Boiler house	30
	Warehouse	27

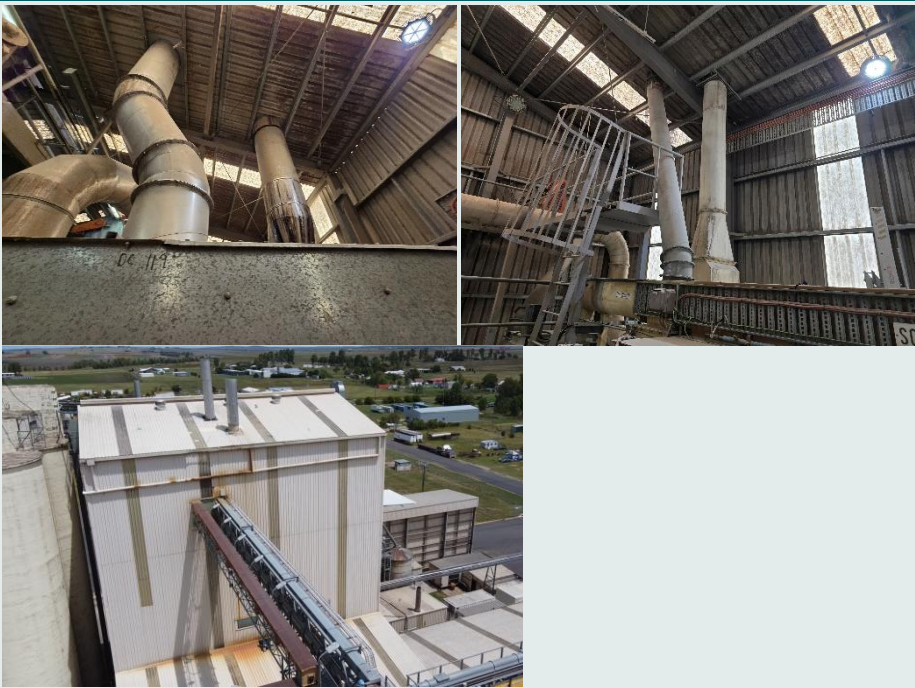
Receptor	Consolidated source	Predicted contribution (S00), dB(A) $L_{Aeq,1hr}$
R14	Roof cyclone fans	44
	Boiler house	42
	Mill building	40
	Outload roof fans	37
	Grain intake	34
	Warehouse	34
R15	Roof cyclone fans	43
	Mill building	40
	Boiler house	37
	Grain intake	37
	Outload roof fans	35
	Grain dust extractor	29

Note: For clarity, façade-specific source contributions from the same building have been logarithmically summed and presented as consolidated building or plant item contributions. provides a summary of the dominant fixed plant source contributors at each receptor.

Appendix B. Photographs and site observation

Location	Observation	Photograph
Mill building	Example weakness in building envelope: • Opening for hoist system • Conveyor paths • Ensure all doors are kept shut when not in use	 The photographs illustrate various weaknesses in the mill building envelope. The top-left image shows a hoist system opening in the building envelope. The top-right image shows conveyor paths within the building. The bottom image shows the exterior of the mill building, highlighting the building envelope and surrounding infrastructure.

Location	Observation	Photograph
	• Hammer mill room façade gaps	 
	• Increase general sound insulation performance of building envelope (walls / roof). • material or construct ontop of existing where feasible within the structural allowance.	 

Location	Observation	Photograph
	Can be implemented from inside with acoustic curtains (or outside of the building.	
Mill building (and all buildings housing noisy plant) - ducting and exhaust outlet to environment	- Externally wrapped and/or internally lined all ducts penetrating the building - Include silencer at outlet or inline attenuator	

Location	Observation	Photograph
Compressor shed	- Correctly fitted all existing acoustic curtain to the walls - Include treatment to the roof same material or construct on top of existing where feasible within the structural allowance. - Include acoustically designed ventilation paths to meet requirements of operation of compressors	
Boiler room	- Correctly fitted all existing acoustic curtain to the walls - Include treatment to the roof same material or construct on top of existing where feasible within the structural allowance - Seal all gaps around any opening including around the acoustic louvers - Externally wrapped and/or internally lined all ducts penetrating the building	

Location	Observation	Photograph
	Include silencer at outlet or inline attenuator	
Warehouse	- Localise treatment of fixed sources (e.g. hoppers) and isolate the area containing oscillating bin discharger / vibratory chute - or upgrade building envelop including roof and fit the roller door with automatic rapid close door	
Outloading hopper	Acoustically wrapped the gravity fed hopper and chute externally and/or lined the inside to minimise impact noise	

Location	Observation	Photograph
Intake shed	Potential redesign of both the intake sheds to allow truck chassis / engine and the trailers to overhang from the pit as they move through different trailer while maintaining an enclosed environment.	 
Condensor fans	- Review operational speed, reduce speed where practicable - Or provide localise enclosure subject to ventilation requirements	
Dust collector fans	- Review operation of unit - Localise enclosure where possible	

Appendix C. Nosie contour map



Legend

- Receptor
- Point source
- Line source
- site boundary
- Industrial building
- Building
- Daytime (50 dBA)
- Evening (47 dBA)
- Night-time (37 dBA)

Noise levels LAeq, 1hr

33 - 38	53 - 58
38 - 43	58 - 63
43 - 48	63 - 68
48 - 53	



Scale at A4:
1:3,400

Drawing title:
S00 Model verification

Date	By	Chkd
29/07/2026	MS	MS
Project No	Drawing No	Rev
26020027	S00	02



Legend

- Receptor
- Point source
- Line source
- site boundary
- Industrial building
- Building
- Daytime (50 dBA)
- Evening (47 dBA)
- Night-time (37 dBA)

Noise levels LAeq, 1hr

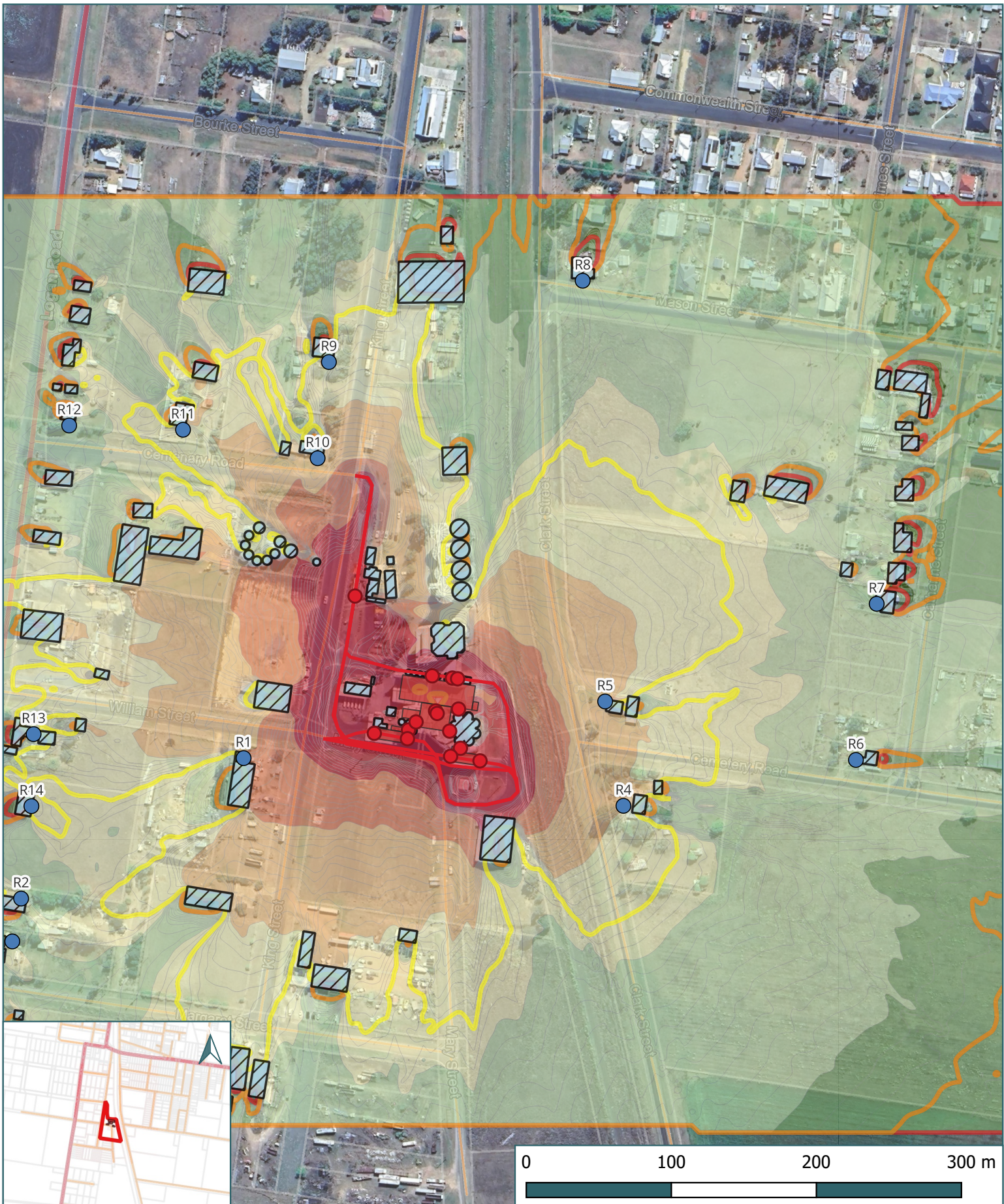
	33 - 38		53 - 58
	38 - 43		58 - 63
	43 - 48		63 - 68
	48 - 53		



Scale at A4:
1:3,400

Drawing title:
S01 Peak hour operation

Date	By	Chkd
29/07/2026	MS	MS
Project No	Drawing No	Rev
26020027	S01	02



Legend

- Receptor
- Point source
- Line source
- site boundary
- Industrial building
- Building
- Daytime (50 dBA)
- Evening (47 dBA)
- Night-time (37 dBA)

Noise levels LAeq, 1hr

	33 - 38		53 - 58
	38 - 43		58 - 63
	43 - 48		63 - 68
	48 - 53		



Scale at A4:
1:3,400

Drawing title:
S02 Proposed Peak hour operation

Date	By	Chkd
29/07/2026	MS	MS
Project No	Drawing No	Rev
26020027	S02	02