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**ALLIED PINNACLE
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PROPOSED
MODIFICATION
(DA-318-12-2004)

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NOVEMBER 2021

PUBLIC

APPENDIX G

CONSTRUCTION NOISE AND VIBRATION ASSESSMENT



**Design
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ALLIED PINNACLE

**PICTON WAREHOUSE
EXTENSION**

CONSTRUCTION NOISE
AND VIBRATION
ASSESSMENT

wsp

SEPTEMBER 2021

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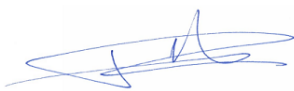
Picton Warehouse Extension
Construction Noise and Vibration Assessment

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1 INTRODUCTION

WSP has been engaged by Allied Pinnacle to prepare a Construction Noise and Vibration Impact Assessment (CNVIA) for the proposed extension of the Allied Flour Mill located in Picton NSW (the proposal). This CNVIA will support a Modification Report for the proposal.

1.1 SCOPE AND PURPOSE

The objectives of the assessment included:

- Identify the nearest noise and vibration sensitive receivers.
 - Determination of the existing background noise environment in the project area.
 - Establish noise and vibration criteria at the nearest potentially affected sensitive receivers.
 - Determine plant required for the construction works and predict noise at the nearest sensitive receivers.
 - Identify potential vibration generated by plant and outline potential vibration risk.
 - Provide construction noise and vibration control recommendations where required, potentially including recommended hours of construction, buffer distances, source mitigation, community consultation and/or other management measures (particularly in the event works outside standard hours are required).
-

1.2 RELEVANT GUIDELINES

This report has been written with reference to the following documents:

- NSW EPA *Noise Policy for Industry 2017* (NPfI).
- NSW DECC *Interim Construction Noise Guideline 2009* (ICNG).
- NSW EPA *Road Noise Policy 2011* (RNP).
- NSW DEC *Assessing Vibration: a technical guideline 2005* (AVTG).
- TfNSW *Construction Noise and Vibration Strategy* (CNVS) (TfNSW, 2019).

Furthermore, the following Standards are referenced in this report:

- Australian Standard AS 1055-2018 - *Acoustics – Description and Measurement of Environmental Noise*
- Australian Standard AS 2436:2010 – *Guide to noise and vibration control on construction, demolition and maintenance sites*
- Department for Environment Food and Rural Affairs (United Kingdom), *Update of noise database for prediction of noise on construction and open sites – Phase 3: Noise measurement data for construction plant used on quarries*
- British Standard BS 7385-2:1993 *Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration*
- German Standard DIN 4150: Part 3 – 1999 *Structural Vibration in Buildings: Effects on Structures*.

Operational noise impacts are outside the scope of this assessment and would be assessed in a subsequent report.

2 BACKGROUND INFORMATION

2.1 SITE LOCATION

The site is located at 330 Picton Road, Maldon NSW in the Local Government Area of Wollondilly Shire 3 km east of the town of Picton, NSW.

Surrounding land uses are mainly commercial industrial and rural residential. The site location is shown in Figure 2.1.

2.2 THE PROPOSAL

Appendix A includes an overview of the proposal. The following works are proposed:

- Warehouse extension including:
 - External expansion of the northwest corner of the existing building (a) as a warehouse extension (north) and (b) as an engineering area extension to the west as indicated in Appendix A.
 - Both sections will use the external concrete slab building walls as their inner wall, with the roofline to match the existing building roof profile.
 - External (new) walls will be either Concrete, Colorbond or PIR Panel.
 - An office, a sheltered concrete slab and a toilet will be installed externally on the northeast corner of the new warehouse extension.
- Internal works to production areas including:
 - Two new production rooms.
 - Third staging area.

2.3 SENSITIVE RECEIVERS

The locations of noise sensitive receivers were adopted from Figure 1 of Allied Picton site report - *Compliance Survey Operational Noise Monitoring Allied Pinnacle Picton* (SLR, December 2019) ('the 2019 report') (ref: 610.19168-R01).

The noise sensitive receivers nearest to the project site are listed in Table 2.1 and Figure 2.1.

Table 2.1 Noise sensitive receivers

RECEIVER ID	ADDRESS	RECEIVER TYPE	DISTANCE TO PROPOSAL WORKS BOUNDARY (m)
R1	1404 Menangle Road, Maldon	Residential	590 (north)
R2	305 Picton Road, Maldon	Residential	620 (north)
R3	460 Wilton Park Road	Residential	1,190 (south west)
R4	390 Picton Road, Maldon	Residential	400 (south east)
C1	Maldon Hatchery	Commercial	570 (north east)
I1	Fitzsimmons Diesels	Industrial	440 (north)

RECEIVER ID	ADDRESS	RECEIVER TYPE	DISTANCE TO PROPOSAL WORKS BOUNDARY (m)
I2	Boral Cement Works	Industrial	630 (west)

(1) Minimum distance of the sensitive receiver buildings to the limits of the construction footprint.

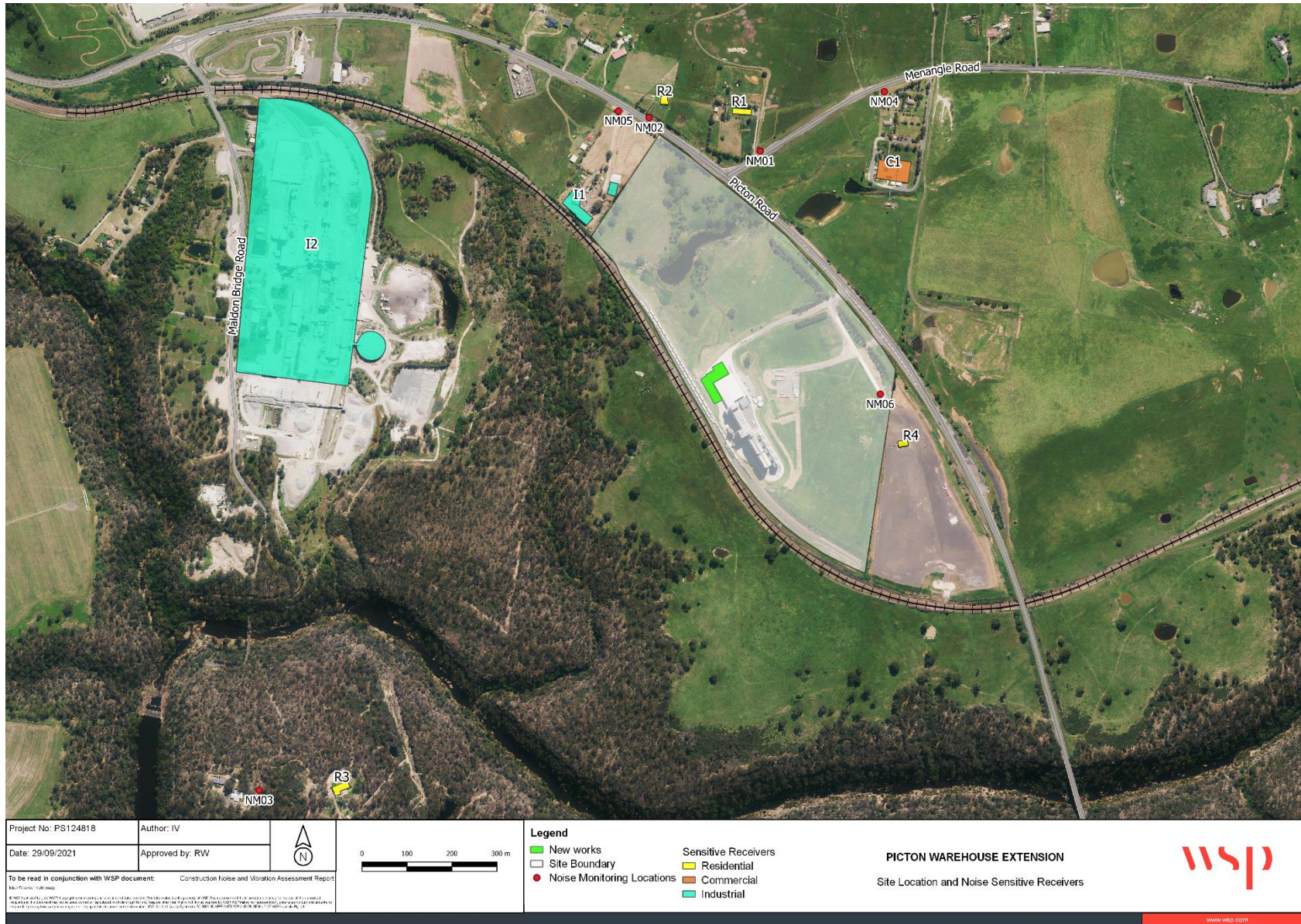


Figure 2.1 Site location and noise sensitive receivers

3 EXISTING NOISE ENVIRONMENT

This section provides an overview of the existing noise environment surrounding the site.

3.1 IMPACT OF COVID-19

Due to current Stay-At-Home orders to reduce the spread of COVID-19, noise monitoring was not able to be conducted at the time of writing of this report. It is expected that current noise levels are likely to be considerably lower than normal levels, due to reduced traffic, and they therefore cannot be considered representative for the location, affected land uses or conditions.

WSP has adopted publicly available existing noise measurement data from past developments in the vicinity of the proposal site. This method has previously been accepted by the NSW EPA where site-specific measurements were unable to be completed.

Noise monitoring data was adopted from historical noise monitoring completed for the Allied Picton site, as reported in the 2019 report.

3.2 EXISTING NOISE ENVIRONMENT

Due to the atypical noise environment as a result of COVID-19 conditions (refer to Section 3.1), noise monitoring was not conducted for the purpose of this assessment.

Prevailing background and ambient noise levels were adopted from the 2019 report. Monitoring was conducted at five monitoring locations representative of the nearest residential receivers to the site in general accordance with the short-term method outlined in the Australian Standard 1055:2018 – *Acoustics – Description and Measurement of Environmental Noise* (AS 1055). It is noted that long term noise measurements at sensitive receivers were not conducted as part of the 2019 report.

It is considered that the adoption of these 2019 noise levels is considered suitable for the purpose of this assessment, and that the measured noise levels in 2019 are still representative of the current noise environment.

The adopted background noise levels (rating background levels) are summarised in Table 3.1.

Table 3.1 Summary of ambient noise levels from 2019 report

NOISE MONITORING (NM) LOCATION (REFERENCE IN 2019 REPORT)	BACKGROUND NOISE LEVEL (dBA RBL ¹)		
	DAY ²	EVENING ²	NIGHT ²
NM01 (Location 3)	47	46	40
NM02 (Location 4)	46	49	40
NM03 (Location 6)	34	29	27
NM04 (Location 2)	43	47	39
NM05 (Location 5)	47	49	43
NM06 (Location 1)	44	44	39

- (1) RBL – Rating Background Level. The overall single-figure background level representing each assessment period (daytime/evening/night-time) as defined in the NPfI.
- (2) Time periods defined in the NPfI – Day: 7am to 6pm Monday to Saturday, 8am to 6pm Sunday; Evening: 6pm to 10pm; Night: the remaining periods.

4 ASSESSMENT CRITERIA

This section describes the criteria used to assess and manage the predicted construction noise and vibration impacts.

4.1 CONSTRUCTION NOISE

The ICNG provides guidance on identifying and understanding the impact of construction noise on sensitive land uses, and the application of reasonable and feasible management measures to minimise construction noise impacts.

4.1.1 CONSTRUCTION ASSESSMENT PERIODS

Table 4.1 outlines the CNVS assessment periods applicable to the proposal.

Table 4.1 CNVS assessment periods

NAME	RATING BACKGROUND LEVEL (RBL) PERIOD	TIME PERIODS
Standard Hours (SH)	Day	Monday to Friday – 7:00 am to 6:00 pm Saturday – 8:00 am to 1:00 pm Sunday/Public Holiday - Nil
Out of Hours Works (OOHW) Period 1	Day	Saturday – 7:00 am to 8:00 am and 1:00 pm to 6:00 pm Sunday and public holidays – 8:00 am to 6:00 pm
	Evening	Monday to Saturday – 6:00 pm to 10:00 pm
Out of Hours Works (OOHW) Period 2	Day	Sunday and public holidays – 7:00 am to 8:00 am
	Evening	Sunday and public holidays – 6:00 pm to 10:00 pm
	Night	All days 10:00 pm to 7:00 am

Works outside standard construction hours should only be conducted when it is not feasible or reasonable to work within standard hours. Construction work may need to be completed outside standard construction hours to maintain a safe work environment or to minimise impacts to operational transport infrastructure and services.

4.1.2 CONSTRUCTION NOISE MANAGEMENT LEVELS

As outlined in the ICNG, a quantitative assessment requires the development of Noise Management Levels (NML) based on existing Rating Background Levels (RBLs), and a comparison of predicted construction noise levels with the developed NMLs. The recommended standard hours defined in the ICNG represent the times of the day when receivers are likely to be less sensitive to noise impacts.

Works are proposed to be undertaken largely during Standard Hours for this proposal, with some works proposed during out of hours periods from 1 pm to 5 pm Saturdays and 7 am to 5 pm Sundays.

Table 4.2 sets out the application of the management levels for noise at residences. Representative RBLs for the study area have been derived from noise monitoring described in Section 3.

Table 4.2 Application of the ICNG noise management levels for residential receivers

TIME OF DAY	NML Leq,15min dBA	HOW TO APPLY
Recommended standard hours: Monday–Friday 7.00 am–6.00 pm Saturday 8.00 am– 1.00 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{eq,15min}$ dBA 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 dBA	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: — 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) — if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Table 4.3 presents the NMLs for each assessment period for residential receivers in each NCA. The NMLs have been calculated from the measured RBLs shown in Table 3.1.

Table 4.3 Noise management levels for residential receivers

RECEIVER ID	NM LOCATION	RBL dBA			NML dBA $L_{eq,15min}^1$			
		DAY	EVENING	NIGHT	SH	OOHW 1	OOHW 2	HNA ²
R1	NM01	47	46	40	57	52	45	75
R2	NM02	46	49	40	56	51	45	75
R3	NM03	34	29	27	44	39	37	75
R4	NM06	44	44	39	54	49	44	75

(1) Time periods as defined in Table 4.1

(2) HNA - Highly Noise Affected

Table 4.4 presents the noise management levels for non-residential receivers affected by the works.

Table 4.4 Noise management levels for non-residential sensitive receivers

LAND USE	NOISE MANAGEMENT LEVEL $L_{eq,15min}$ dBA
Industrial premises	75 ¹
Commercial (offices, retail outlets)	70 ¹

(1) Criteria applicable when in use.

Works are proposed to be undertaken largely during standard hours for this project, with some works proposed during out of hours works (OOHW) periods from 1 pm to 5 pm Saturdays and 7 am to 5 pm Sundays.

4.1.3 SITE SPECIFIC CONSTRUCTION NOISE LEVELS

The specific NMLs for construction activities at surrounding representative receivers are presented in Table 4.5. These NMLs have been determined from the background noise levels provided in Table 4.3 for residential receivers

Table 4.5 Site specific noise management levels

NCA	NOISE MANAGEMENT LEVEL dBA $L_{eq,15 min}^1$			
	SH	OOHW 1	OOHW 2	HNA
Residential receiver R1	57	52	45	75
Residential receiver R2	56	51	45	75
Residential receiver R3	44	39	37	75
Residential receiver R4	54	49	44	75
Commercial ²	70	n/a	n/a	n/a
Industrial premises ²	75	n/a	n/a	n/a

(1) Time periods as defined in Table 3.1.

(2) Criteria apply when in use. It is assumed that commercial premises are unlikely to be operational outside standard hours.

Feasible and reasonable mitigation and management measures, as defined in the ICNG, are to be implemented where NMLs are exceeded.

4.2 CONSTRUCTION TRAFFIC NOISE

The RNP provides guidance on the assessment of noise impacts from road traffic noise on sensitive receivers.

The RNP criteria apply to traffic generated by construction activities. The existing roads immediately surrounding the Proposal are sub-arterial and arterial roads and local roads. Arterial, sub-arterial and collector roads are assessed over day (7.00 am-10.00 pm) and night (10.00 pm-7.00 am) periods and local roads are assessed over a one hour period (typically the peak hour) within the respective day and night periods.

Table 4.6 presents a summary of the applicable criteria for residences.

Table 4.6 Road traffic noise criteria for residential receivers on existing roads affected by additional traffic from land use developments

ROAD TYPE	ROAD TRAFFIC NOISE CRITERIA	
	DAY	NIGHT
Arterial/Sub-arterial/Collector	60 dBA L_{eq} 15hr	55 dBA L_{eq} 9hr
Local Roads	55 dBA L_{eq} 1hr	50 dBA L_{eq} 1hr

The RNP application notes state that ‘for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level as a result of the development should be limited to 2 dBA above that of the noise level without the development. This limit applies wherever the noise level without the development is within 2 dBA of, or exceeds, the relevant day or night noise assessment criterion.’

Therefore, if the road traffic noise levels increase by more than 2 dBA as a result of the proposed construction traffic and the criteria in Table 4.6 are exceeded, investigation of mitigation options would be required.

4.3 CONSTRUCTION VIBRATION

Vibration associated with construction activities can result in impacts on human comfort or the damage of physical structures such as dwellings. These two impacts have different criteria, with the effects of vibration on human comfort having a lower threshold.

Regarding human comfort, vibration arising from construction activities must comply with criteria presented in *Assessing Vibration: a technical guideline*, (DECC, February 2006) and *British Standard 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting* (BS 6472 1 2008).

Section J4.4.3 of *Australian Standard AS2187.2 – 2006 Explosives – Storage and use Part 2: Use of explosives* provides frequency-dependent guide levels for cosmetic damage to structures arising from vibration. These levels are adopted from *British Standard BS7385: 1990 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from groundborne vibration* (BS7385-2:1993). In addition, further guidance on ground vibration assessment is contained in the German Standard 4150-3 *Structural Vibration, Part 3: Effects of Vibration on Structures* (DIN 4150-3).

Section 7 of the CNVG recommends safe working distances for achieving human comfort (*Assessing Vibration: a technical guideline* (DECC, February 2006) and cosmetic building damage (BS7385-2:1993) criteria for a range of different plant and equipment. These are discussed further in Section 5.4.

No items of heritage significance have been identified in the proposal study area.

5 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

5.1 CONSTRUCTION STAGING AND SCENARIOS

The proposal would be constructed in stages with the stages occurring at different times depending on the activity.

Table 5.1 presents the assessed noise generating construction scenarios based on available project information.

It is understood that construction works are expected to be conducted over a four (4) month period commencing in Quarter 4, 2021. Construction activities would be undertaken 7am to 5pm, Monday to Sunday.

Table 5.1 Construction stages and equipment

SCENARIO ID	STAGE
SC01	Site establishment and demolition
SC02	Excavation
SC03	Construction of buildings
SC04	Backfilling and demobilisation

5.2 CONSTRUCTION NOISE ASSESSMENT

5.2.1 NOISE SOURCE LEVELS

The nominated equipment for the construction work scenarios and the sound power level (SWL) of each item are detailed in Table 5.2. SWLs have been sourced from the CNVS, AS 2436:2010 – *Guide to noise and vibration control on construction, demolition and maintenance sites* and the *Department for Environment Food and Rural Affairs (United Kingdom), Update of noise database for prediction of noise on construction and open sites – Phase 3: Noise measurement data for construction plant used on quarries* (DEFRA noise database).

Table 5.2 Sound Power Levels (SWL)

EQUIPMENT	SWL, dBA	NO. OF EQUIPMENT PER SCENARIO			
		SC01	SC02	SC03	SC04
Bobcat	104	1	1		
Concrete pump	109			1	
Concrete truck	109			1	
Franna crane	98			1	
Elevated work platform	98	2	2	2	2
Excavator (5 tonne)	100	1	1		1
Forklift	104	1	1	1	
Tip truck	108		1	1	
Total dBA SWL per scenario		109	111	114	105

5.2.2 PREDICTED NOISE LEVELS

The predicted noise levels for each scenario are presented in Table 5.3 outlining the noise level at each sensitive receiver.

The calculations are conservative as they include all equipment operating simultaneously at their closest point to the receiver in a worst case 15-minute period, and do not account for terrain or shielding effects. Actual noise levels from the construction site would be expected to be lower.

Where a predicted noise level exceeds a less stringent management level (SH), it follows that the more stringent (OOHW) management levels are also exceeded. The formatting of the construction noise assessment results (Table 5.3) indicates the following:

- The orange shaded cells show exceedances of the standard-hours day period.
- The blue shaded cells show exceedances of the OOHW 1 period.
- The green shaded cells show exceedances of the OOHW 2 period

Table 5.3 Worst-case predicted construction noise levels

ID	RECEIVER TYPE	DISTANCE FROM WORKS (m)	NOISE MANAGEMENT LEVEL, dBA $L_{eq,15min}^1$				PREDICTED MAXIMUM NOISE LEVEL PER SCENARIO, dBA $L_{eq,15min}^2$			
			SH	OOHW 1	OOHW 2	HNA ¹	SC01	SC02	SC03	SC04
R1	Residential	590 (north)	57	52	45	75	45	48	51	41
R2	Residential	620 (north)	56	51	45	75	45	48	50	41
R3	Residential	1,190 (south west)	44	39	37	75	39	42	45	35
R4	Residential	400 (south east)	54	49	44	75	49	51	54	45
C1	Commercial	570 (north east)	70	n/a	n/a	n/a	46	48	51	42
I1	Industrial	440 (north)	75	n/a	n/a	n/a	48	50	53	44
I2	Industrial	630 (west)	75	n/a	n/a	n/a	45	47	50	41

- (1) Time periods as defined in Section 4; HNA – Highly noise affected
- (2) Where a predicted noise level exceeds a less stringent management level (SH), it follows that the more stringent (OOHW) management levels would also be exceeded

5.2.3 NOISE IMPACTS

The results presented in this assessment demonstrate that predicted construction noise levels at the majority of sensitive receivers would be within the NMLs during the Standard Hours construction periods, with the exception of a minor (1 dB) exceedance at Receiver R3 during SC03.

During works in OOHW period 1, noise levels are predicted to comply at all receivers with the exception of residential receiver R3 and R4. Levels, where exceedances up to 6 dB are predicted during SC02 and SC03.

During OOHW period 2, exceedances of NMLS are predicted at all four residential receivers, with exceedances up to 10 dB predicted during SC03, up to 7 dB during SC02, up to 5dB during SC01 and a minor exceedance of up to 1 dB predicted at receiver R04 during SC04.

No residential receivers are anticipated to be highly noise affected by the construction activities.

For the nearest non-residential receivers, noise levels are predicted to be within the relevant NMLs criteria for all scenarios.

Scenario SC03 (construction of buildings) generates the greatest impact to sensitive receivers.

Levels assume noisiest plant operating at any point within the construction footprint to the receiver, however noise levels are expected to be significantly lower than the above predictions for the majority of the works when mitigation measures are in place and considering the spatial distribution of noise sources. Works are expected to take place intermittently over any construction period, so any noise exceedances would be expected to be of short duration and would not be expected to occur continuously over the duration of the proposal.

It is noted that receiver R03 is located over one km from the construction footprint; noise level exceedances are predicted at this location as a result of the low background noise level at this receiver. However, the impacts presented in this report are conservative and inform noise management at mitigation at this receiver.

Where works are undertaken outside Standard Hours construction periods, the investigation and implementation of additional noise management and mitigation measures is required. Noise mitigation and management measures have been outlined in Section 6.

5.3 CONSTRUCTION TRAFFIC NOISE

5.3.1 INTRODUCTION

Construction vehicle movements have the potential to generate temporary noise impacts to receivers adjacent to the haul routes. Construction traffic information was sourced from the Traffic and Transport Memorandum (WSP 2021)

5.3.2 TRAFFIC NOISE ASSESSMENT

Construction vehicles accessing the site would temporarily increase the number of traffic movements along the traffic network. It is understood that construction traffic would access the proposal site compound and laydown areas from Picton Road from the Hume Highway.

Based on the Traffic and Transport Memorandum provided for the proposal, it is understood that on a maximum of 25 personnel required to conduct the proposal works. Up to 5 heavy vehicles would be required per day to deliver equipment and remove material as required. It is assumed that 25 light vehicles and 5 heavy vehicles are required daily to access proposal work sites.

5.3.3 BASED ON THE TRAFFIC AND TRANSPORT MEMORANDUM, CURRENT TRAFFIC VOLUMES ON PICTON ROAD ARE IN THE ORDER OF 782 VEHICLES DURING PEAK HOUR. TRAFFIC NOISE IMPACTS

The potential for noise impacts to occur due to light and heavy vehicle movements on public roads generated by the construction work as a result of additional vehicle movements has been qualitatively assessed with respect to existing traffic on Menangle Road.

It would be assumed that a majority of workers would arrive at site before 7.00 am and depart after 6.00 pm, and that deliveries would be spread across the day.

An approximate 60 per cent increase in traffic is required to increase traffic noise levels by more than 2 dB. Traffic generated by the proposal's construction activities are not expected to be significant compared with the existing traffic volumes, particularly in comparison to existing flows on Picton Road. As a result, noise impacts on the existing roads as a result of construction generated traffic are not anticipated to result in a 2 dB increase on existing traffic noise levels. Therefore, impacts due to the project are expected to comply with the RNP criteria.

It is recommended that heavy vehicle movements to and from the site be restricted to standard (daytime) hours where feasible. Nonetheless, traffic noise mitigation measures are outlined in Section 5.

5.4 CONSTRUCTION VIBRATION ASSESSMENT

Certain construction activities would require the use of vibration intensive equipment which may affect the nearest sensitive receivers. The most vibration intensive plant nominated as part of the work is the use of an excavator to jackhammer hard substrate (i.e. rock).

Table 5.4 presents the indicative minimum working distances for the nominated construction plant to minimise the risk of structural damage and human comfort for sensitive receivers. The distances are indicative only and results may vary depending on the activity, equipment, local ground, and receiver conditions.

Table 5.4 Recommended minimum working distances for vibration intensive plant

PLANT ITEM	RATING / DESCRIPTION	MINIMUM WORKING DISTANCE	
		COSMETIC DAMAGE	HUMAN COMFORT
Excavator	(~20t)	2 m	7 m

PLANT ITEM	RATING / DESCRIPTION	MINIMUM WORKING DISTANCE	
		COSMETIC DAMAGE	HUMAN COMFORT
Hydraulic hammer	(900 kg – 12 to 18t excavator)	7 m	23 m

All receivers are located outside the minimum working distances for cosmetic damage and human comfort (refer to Section 2.3).

If minimum working distances are complied with, no adverse impacts are expected for structural damage, cosmetic damage or human response on nearby sensitive receivers. If works occur within these minimum working distances, mitigation measures outlined in Section 6 should be considered.

No heritage items or buildings with the potential for structural damage were identified within the safe working distances of the footprint, therefore vibration impacts to heritage structures are not considered further in this assessment. This should be confirmed as part of a Construction Noise and Vibration Management Plan (CNVMP) should include management at these locations before the commencement of construction activities and after construction is completed. Structures that are potentially at risk of threshold or cosmetic damage would be identified by the contractor prior to the commencement of construction works.

6 MITIGATION AND MANAGEMENT

This section details recommended feasible and reasonable noise and vibration management and mitigation measures to be implemented by the contractor to manage and control potential impacts from the remediation works.

6.1 STANDARD CONSTRUCTION NOISE AND VIBRATION MITIGATION

The CNVS outlines standard measures for mitigating and managing construction noise and vibration to be implemented across all TfNSW I&P construction proposals where reasonable and feasible. These standard measures are outlined in Appendix B.

Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the ICNG and CNVS. The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered include:

- regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise
- avoiding any unnecessary noise when carrying out manual operations and when operating plant
- avoiding/limiting simultaneous operation of noisy plant in discernible range of a sensitive receiver where practicable.
- switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded.
- restriction of heavy vehicle movements to and from the site to standard (daytime) hours where feasible.
- no idling of delivery trucks.
- keeping truck drivers informed of designated routes, parking locations and acceptable delivery hours for the site.
- compounds and work areas designed to promote one-way traffic so that vehicle reversing movements are minimised.
- minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
 - maximising the offset distance between noisy plant and adjacent sensitive receivers
 - using the most suitable equipment necessary for the construction works at any one time
 - directing noise-emitting plant away from sensitive receivers
- regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc.
- works would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays) as far as practicable.
- work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that ‘line of sight’ is broken, where feasible.

Table 6.1 provides indicative benefits of typical engineering control mitigation measures for construction activities, based on guidance in AS 2436 and experience on similar construction proposals.

Table 6.1 Indicative noise reduction from construction controls

ENGINEERING CONTROLS	POSSIBLE NOISE REDUCTION, dB
Portable temporary screens	5-10
Screen or enclosure for stationary equipment	10-15
Maximising the offset distance between noisy plant items and sensitive receivers.	3-6
Avoiding using noisy plant simultaneously and/or close together, adjacent to sensitive receivers.	2-5
Orienting equipment away from sensitive receivers.	3-5
Carrying out loading and unloading away from sensitive receivers.	3-5
Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks	5-10
Selecting site access points and roads as far as possible away from sensitive receivers	3-6

It is considered that the implementation of the above measures would be sufficient to manage noise levels during construction of the proposal.

6.2 TRAFFIC MANAGEMENT

This assessment has demonstrated that the proposal will generate a minor increase in traffic noise on affected roads associated with the construction activities, however levels are expected to remain within RNP criteria. As best practice, it is recommended that a traffic management plan be developed for the proposal, and its findings used to inform the CNVMP.

7 CONCLUSION

WSP has completed a noise assessment for a proposed extension of the Allied Flour Mill located in Picton NSW. The assessment was conducted with reference to the *Construction Noise and Vibration Strategy* (CNVS) (TfNSW, 2019).

Sensitive receivers surrounding the proposal included residences, commercial and industrial areas.

Due to current Stay-At-Home orders reducing the spread of COVID-19, background noise levels surrounding the Proposal were adopted from a noise assessment previously undertaken in 2019. These background noise levels were used to derive the project specific noise criteria for residential and non-residential receivers to assess potential noise and vibration impacts during construction and operations.

To assess the potential noise impacts during construction, four representative construction scenarios were developed based on indicative staging information. Precise construction methodology would be confirmed by the construction contractor, however potential noise impacts associated with an indicative construction staging has been conservatively assessed to facilitate effective noise management and mitigation prioritisation.

The assessment of construction noise impacts indicates that noise levels are predicted to comply with relevant NMLs where works are conducted during Standard Hours, with a minor exceedance identified at one receiver. Where works occur outside Standard Hours, noise levels are predicted to exceed relevant NMLs at the nearest sensitive residential receivers

Noise impacts from proposal-related construction traffic are expected to comply with RNP criteria.

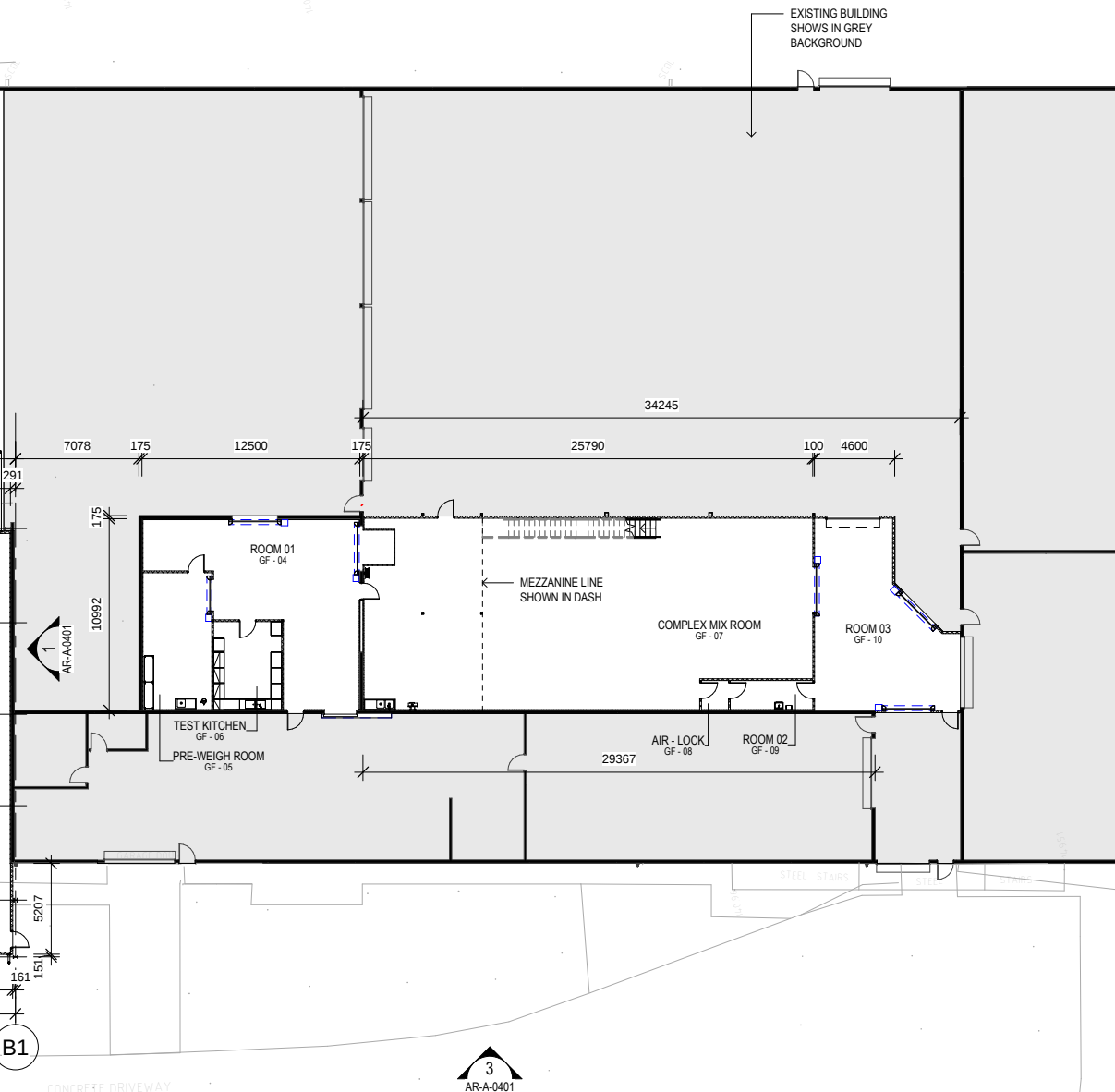
Noise mitigation and management measures have been outlined to reduce the potential noise impacts from construction noise and vibration associated with the proposal.

The information presented in this report should be reviewed if any modifications to the features of the development specified in this report occur, including modifications to the building and introduction of any additional noise sources.

APPENDIX A

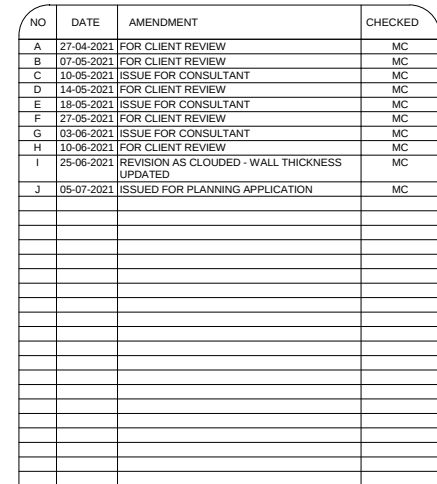
SITE PLANS





NOTE:

1. ALL LOADBEARING WALLS TO BE FULL HEIGHT.
2. ALL INTERNAL WALLS EXCEPT FULL HEIGHT WALLS TO EXTEND 200MM ABOVE THE CEILING.
3. ALL STUD WALLS TO EXTERNAL BRICK VENEER TO EXTEND TO UNDERSIDE OF ROOF SHEETING WITH INSULATION. REFER TO A2000 SERIES WALL SETOUT DRAWINGS FOR INFORMATION FOR SETOUT WALL TYPES AND HEIGHTS.
4. FIRE WALLS TO EXTEND TO UNDERSIDE OF ROOF SHEETING AND FULLY SEALED U.N.O.
5. DIMENSIONS PROVIDE REFERENCE TO THE STRUCTURAL FACE OF NEW WALLS OR TO THE FINISHED FACE OF EXISTING WALLS. REFER TO A800 SERIES DRAWINGS FOR ROOM LAYOUT PLANS AND ELEVATIONS.
6. REFER TO LANDSCAPE AND SITE DRAWINGS FOR SETOUT AND LEVELS OF EXTERNAL PAVEMENTS, COVERED LINKS AND ANCILLARY STRUCTURES.
7. VERIFY DIMENSIONS ON SITE, PRIOR STARTING WORK



PRELIMINARY
NOT FOR CONSTRUCTION

Nominated Architect:
Michael Cook NSW Reg. No. 7397

APPENDIX B

MITIGATION MEASURES



B1 STANDARD MITIGATION MEASURES

Table B.1 Standard management measures to reduce construction noise and vibration

ACTION REQUIRED	APPLIES TO	DETAILS
Implementation of any proposal specific mitigation measures required	Airborne noise Ground-borne noise & vibration	In addition to the measures set out in this table, any project specific mitigation measures identified in the EIA documentation (e.g. REF, submissions or representations report) or approval or licence conditions must be implemented.
Implement stakeholder consultation measures (refer to Sections 8.2.1 and 8.3 for further details of community consultation measures)	Airborne noise Ground-borne noise & vibration	Periodic notification (monthly letterbox drop and website notification) detailing all upcoming construction activities delivered to sensitive receivers at least 7 days prior to commencement of relevant works. In addition to Periodic Notification, the following strategies may be adopted on a case-by-case basis: • Project Specific Website • Project Infoline • Construction Response Line • Email Distribution List • Web-based Surveys • Social Media • Community and Stakeholder Meetings and • Community Based Forums (if required by approval conditions).
Register of noise and vibration sensitive receivers	Airborne noise Ground-borne noise & vibration	A register of most affected noise and vibration sensitive receivers (NVSRs) would be kept on site. The register would include the following details for each NVSR: • Address of receiver • Category of receiver (e.g. Residential, Commercial etc.) • Contact name and phone number. The register may be included as part of the Project's Community Liaison Plan or similar document and maintained in accordance with the requirements of this plan.
Construction hours and scheduling	Airborne noise Ground-borne noise & vibration	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating noise with special audible characteristics and/or vibration levels should be scheduled during less sensitive time periods.
Construction respite period	Ground-borne noise & vibration Airborne noise	Noise with special audible characteristics and vibration generating activities (including jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling) may only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block. 'Continuous' includes any period during which there is less than a 1 hour respite between ceasing and recommencing any of the work. No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work may be undertaken in the same NCA over any 7-day period, unless otherwise approved by the relevant authority.
Site inductions	Airborne noise Ground-borne noise & vibration	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on noise generating activities with special audible characteristics

ACTION REQUIRED	APPLIES TO	DETAILS
Site inductions <i>continued</i>		• Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures.
Behavioural practices	Airborne noise	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors. No excessive revving of plant and vehicle engines. Controlled release of compressed air.
Monitoring	Airborne noise Ground-borne noise & vibration	A noise monitoring program should be carried out for the duration of works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions.
Attended vibration measurements	Ground-borne vibration	Attended vibration measurements shall be undertaken at all buildings within 25 metres of vibration generating activities when these activities commence to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.
Update Construction Environmental Management Plans	Airborne noise Ground-borne noise & vibration	The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies.
Building condition surveys	Vibration Blasting	Undertake building dilapidation surveys on all buildings located within the buffer zone prior to major project construction activities with the potential to cause property damage.

Table B.2 Standard source measures to reduce construction noise and vibration

ACTION REQUIRED	APPLIES TO	DETAILS
Plan worksites and activities to minimise noise and vibration	Airborne noise Ground-borne vibration	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.
Equipment selection	Airborne noise Ground-borne noise & vibration	Use quieter and less vibration emitting construction methods where feasible and reasonable, see APPENDIX C. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits.
Maximum noise levels	Airborne-noise	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the allowable noise levels in APPENDIX C.
Rental plant and equipment	Airborne-noise	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the allowable noise levels in APPENDIX C.
Use and siting of plant	Airborne-noise	Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers.
Non-tonal reversing alarms	Airborne noise	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out-of-hours work, including delivery vehicles.

ACTION REQUIRED	APPLIES TO	DETAILS
Minimise disturbance arising from delivery of goods to construction sites	Airborne noise	Loading and unloading of materials/deliveries is to occur <i>as far as possible</i> from sensitive receivers.
Minimise disturbance arising from delivery of goods to construction sites <i>continued</i>		Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.
Construction Related Traffic	Airborne noise	Schedule and route vehicle movements away from sensitive receivers and during less sensitive times. Limit the speed of vehicles and avoid the use of engine compression brakes. Maximise on-site storage capacity to reduce the need for truck movements during sensitive times.
Silencers on Mobile Plant	Airborne noise	Where possible reduce noise from mobile plant through additional fittings including: Residential grade mufflers Damped hammers such as “City” Model Rammer Hammers Air Parking brake engagement is silenced.
Prefabrication of materials off-site	Airborne noise	Where practicable, pre-fabricate and/or prepare materials off-site to reduce noise with special audible characteristics occurring on site. Materials can then be delivered to site for installation.
Engine compression brakes	Airborne noise	Limit the use of engine compression brakes at night and in residential areas. Ensure vehicles are fitted with a maintained original equipment manufacturer exhaust silencer or a silencer that complies with the National Transport Commission’s ‘In-service test procedure’ and standard.

Table B.3 Standard path measures to reduce construction noise and vibration

ACTION REQUIRED	APPLIES TO	DETAILS
Shield stationary noise sources such as pumps, compressors, fans etc	Airborne noise	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix F of AS 2436: 1981 lists materials suitable for shielding.
Shield sensitive receivers from noisy activities	Airborne noise	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when siting plant.

ABOUT US

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