

Attachment AW

Noise Management Plan for the Heritage Core DA

Noise Management Plan for DA Yarralumla Brickworks Heritage Core

On Behalf of
Fore Group for DOMA

2 July 2023

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1 Background

Paradigm 42 has been engaged by Fore Group to prepare a noise management plan for DA for the proposed commercial development located on the site of the Heritage Core of the Yarralumla Brickworks. The noise emissions from the commercial component only have been addressed but not the noise intrusion into the residential components from other sources.

In this report we have:

1. Established noise emission criteria from the Heritage Core only, including plant;
2. Identified noisy uses in each building;
3. Established noise emissions for each noise assessable space;
4. Shown how the criteria at the nearest noise sensitive receivers will be met in our recommendations.

1.1 Planning

From email received from EPA Planning Liaison 15/11/2022:

The following lease clause will be inserted into the Crown Lease and read:

NOISE MANAGEMENT PLAN

That the Lessee, at the cost of the Lessee, shall to the satisfaction of the Environment Protection Authority (EPA) or its successor(s), comply with the requirements set out in the Noise Management Plan (NMP) prepared by Paradigm 42 Pty Ltd, version 3 dated 1 May 2023, or any NMP that replaces these documents, as endorsed in writing by the Environment Protection Authority (EPA) or its successor;

MISCELLANEOUS APPLICATION ENCUMBRANCE

1. The applicant/lessee must prepare, in coordination with the Environment Protection Authority, a MISCELLANEOUS APPLICATION ENCUMBRANCE (MAE) for registration at Access Canberra Land Titles against the Crown lease of Block Section Suburb . At a minimum, the MAE shall include a copy of the NMP referred to in the Crown lease.

Note: The registration of the MAE is to occur at the same time as the documents giving effect to the variation.

This is quoted verbatim. Note that we are not qualified to comment on a 'Miscellaneous Application Encumbrance' and queries should be directed to EPA, EPSDD or a planning consultant.

By the inclusion of this phrase in the Crown Lease if uses change, another noise management plan can be prepared and endorsed by the EPA.

As we read it also means that compliance does not have to be achieved until a noisy use is to open in any of the allocated spaces.

1.2 Permissible Uses

Included in the permissible uses is 'Drinking Establishment', 'Indoor Recreation Facility', and 'Restaurant'. This noise management plan includes these uses at an internal noise level of 85 dB(A), which represents noise typically in a restaurant or bar with background music. If there is a requirement for a venue with higher noise levels another noise management plan is required to be prepared and endorsed by the EPA.

2 References

1. Multi Unit Housing Development Code, *Territory Plan*, ACT Government (*MUHDC*);
2. *Yarralumla Precinct Map and Code*;
3. Australian/New Zealand Standard *AS 2107-2000 Acoustics – Recommended design sound levels and reverberation times for building interiors* (AS 2107);
4. Australian/New Zealand Standard *AS/NZS 3671 - Acoustics – Road Traffic Noise Intrusion Building Siting and Design*, (AS 3671);
5. *Environmental Protection Regulation 2005*, version effective 24 February 2016, (*EPR*);
6. *Guidelines for the preparation of Noise Management Plans for development applications*, Environment Protection Authority, February 2014, (Guide for NMP);
7. *Noise Measurement Manual*, Environment Protection Authority, ACT, September 2009
8. *Commercial Waste Collection Code*;
9. Smith, Peters and Owen, *Acoustics and Noise Control*, Second Edition, Edinburgh, 1996;
10. Bies D.A., and Hanson C.H., *Engineering Noise Control, Theory and Practice*, Third Edition, 2003, Spon Press, NY, especially p. 342, formula (8.16);
11. *Territory Plan*, via ACTMAPi accessed 22 November 2021;
12. Drawings from SJB Architects: Job No.: 5479, dated 15.10.2022, 'For Information'.

2.1 Personnel Qualifications

This report was prepared by Alan Subkey MAAS. Alan has been a full member of the Australian Acoustical Society since April 2005. He has practised acoustics in the ACT since January 2005. A fuller CV is available on request.

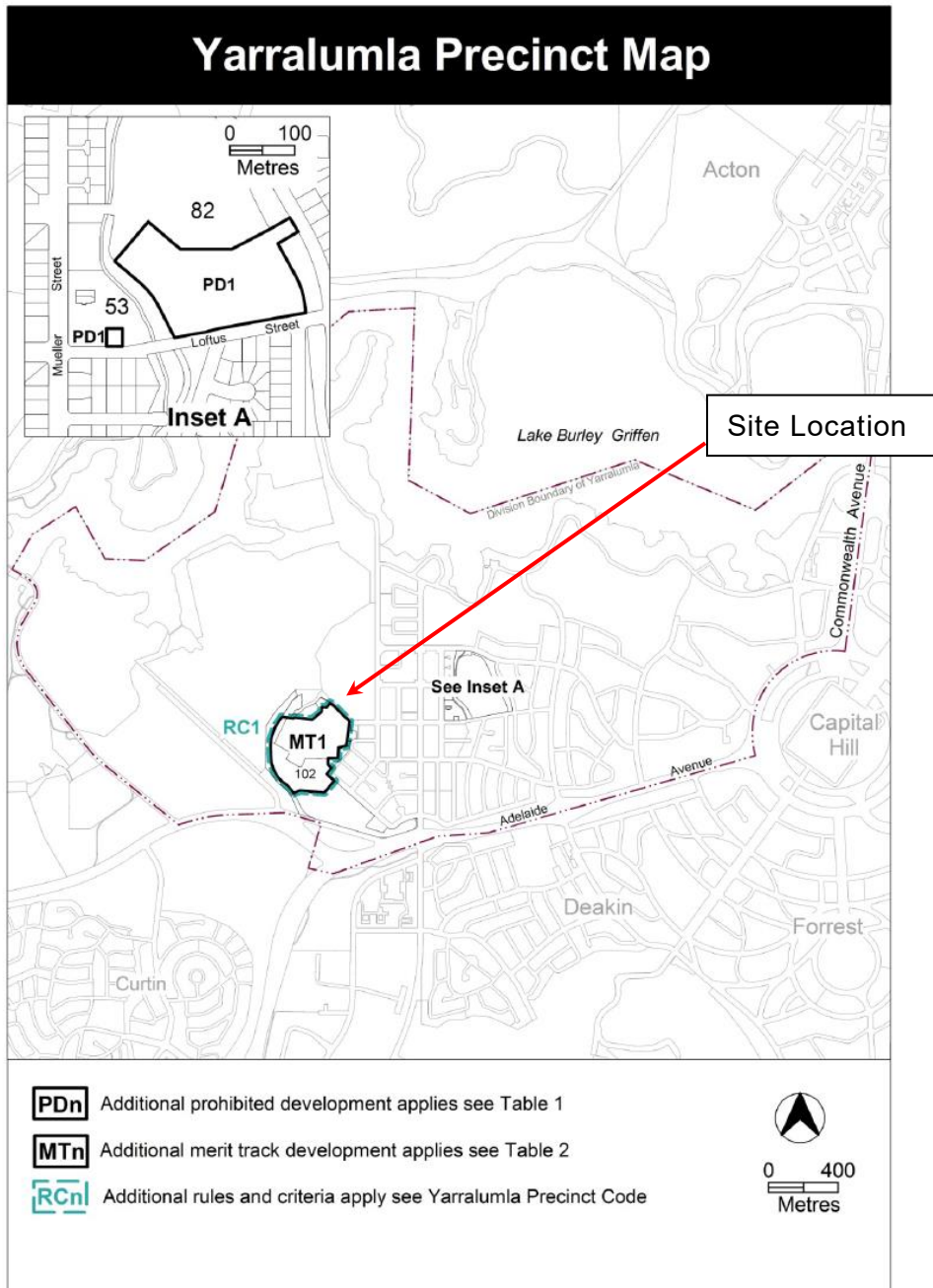
2.1 Disclaimer:

This report has been prepared for DA. It is not intended 'For Construction' or for 'Building Approval', or for specific uses for the commercial premises. We take no responsibility for any 'indicative recommendations' only the acoustic ratings, as set out in this report. This report is based on the referenced drawings above and therefore superseded on the issue of new drawings. For BA the certifier should satisfy themselves that the recommendations made here are still appropriate and have been reviewed. Without preparing the BA report we will not be certifying any part of the building, and the acoustic consultant appointed will be responsible for any certification, therefore they should review our recommendations.

3 Site Description

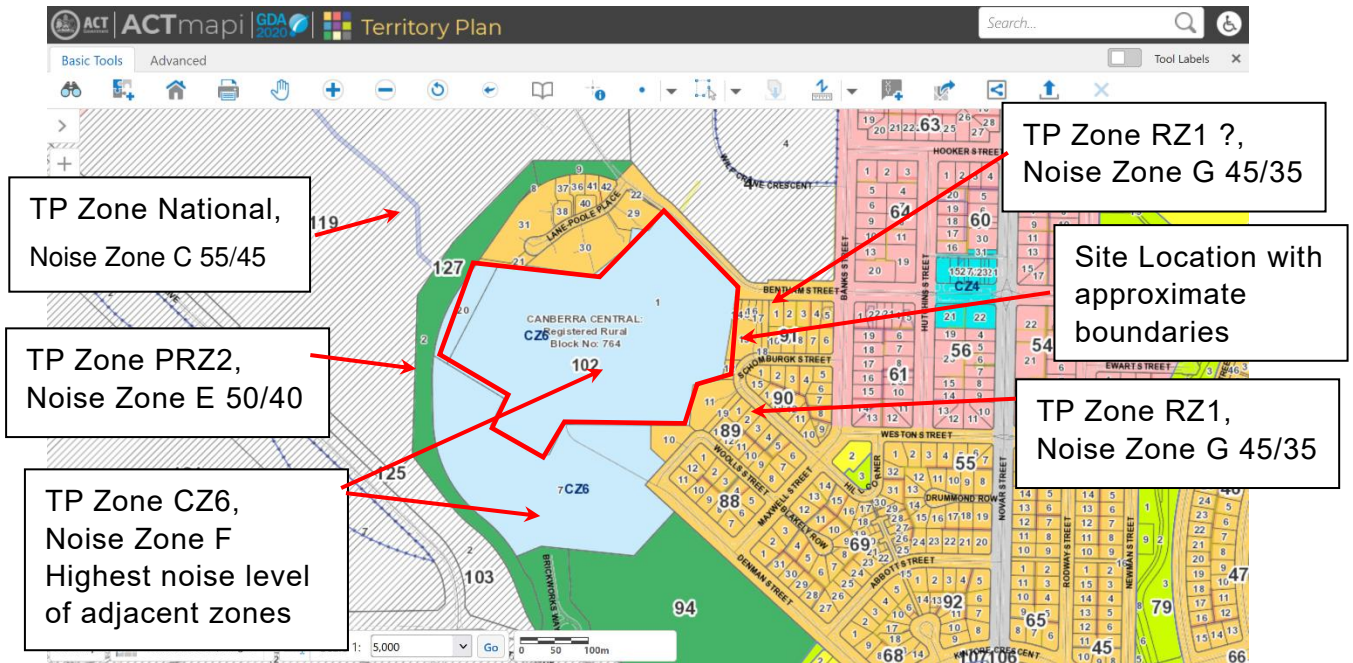
This development is at Yarralumla: Block 1, Section 102, see Figure 1 and Figure 2. Figure 1 shows the approximate site location. For more precise location refer Figure 2. The dotted green line indicates the Brick Works. The Precinct Map shows that there are extra rules and criteria. We have performed a search of the document and cannot find any criteria that relate to noise.

Figure 1: Approximate site Location from Yarralumla Precinct Map and Code



The site was formerly a brick works. The buildings in the Heritage Core will be refurbished buildings that were once used for the various aspects of fired brick production. Some residential is also to be constructed on the site. The closest are in Precinct 1 and 3 as shown in Figure 3, as well further away on the eastern side of the quarry shown in Figure 3.

Figure 2: Site Location from ACTmapi accessed 22 November 2021 and checked 27 June 2023



We understand that the northeast corner may have been rezoned from RZ1 to CZ6. This may be the case but is not yet reflected in The Territory Plan and we have left it unchanged with the most stringent noise zone.

3.1 Description of Proposed Development

The proposal is to develop the Heritage Core with commercial uses, and residential across much of the rest of the site.

3.2 Permissible uses

Currently the proposed commercial uses as per the Crown Lease include to the following noisy uses:

1. Drinking establishment;
2. Indoor recreation facility;
3. Restaurant.

Other uses are permitted, however, they are not considered noisy and do not require assessment.

Figure 3: Extent of the Heritage Core



3.3 Noise Emissions

Noise sources to be assessed from the proposed development are:

1. Plant noise from sources on site . This will include refrigeration plant, air-conditioning condensers, etc;
2. Noise from commercial businesses within the premises such as a bar, gym or a cafe. Under the Crown Lease these are listed as:
 - a. Drinking establishment;
 - b. Indoor recreation facility;
 - c. Restaurant.

To avoid confusion this is the terminology used in this report. We have defined usage below in Table 1.

3.4 Location of Noisy Uses

The buildings shown as 'Noisy Uses' in Table 1 have been assessed for 'Restaurant', 'Indoor Recreation Facility' and 'Drinking Establishment' for the Crown Lease at 85 dB(A). Under the recommended changes to the Crown Lease if any of the other buildings are to be changed to one of these noisy uses, or a proponent wants to allow noisier usage, a new Noise Management Plan should be prepared. The location of each building can be seen in Figure 4.

Table 1: Location of each noisy use

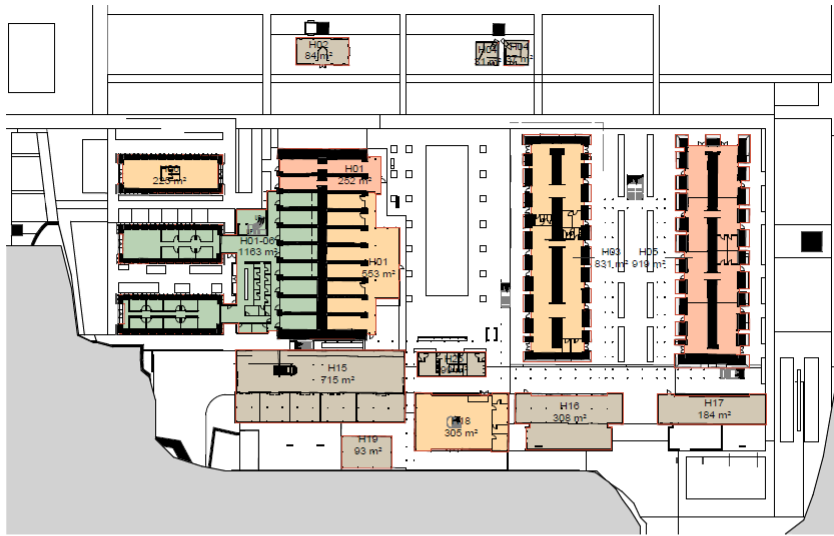
Building	Level	Noisy Usage
H01	Ground Floor	Yes

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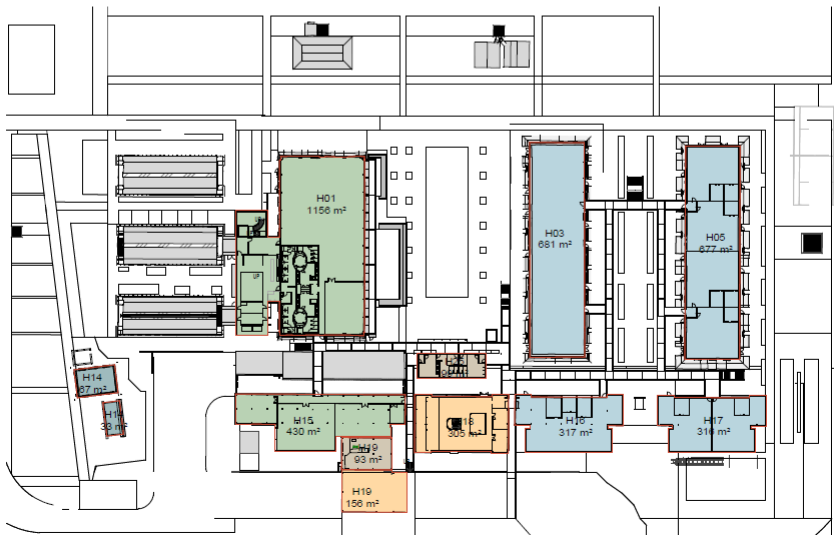
H01	Level 1	Yes
H02-	Ground Floor	No
H03	Ground Floor	Yes
H03	Level 1	Yes
H04	Ground Floor	No
H05	Ground Floor	Yes
H05	Level 1	Yes
H06 western wing only	Ground Floor	Yes
H14	Ground Floor	Yes
H14	Level 1	Yes
H15	Ground Floor	No
H15	Level 1	No
H16	Ground Floor	o
H16	Level 1	No
H17	Ground Floor	No
H17	Level 1	No
H18	Ground Floor	Yes
H18	Level 1	Yes
H19	Ground Floor	No
H19	Level 1	No
H25	Ground Floor	No
H25	Level 1	No

This can be distilled to buildings requiring assessment as H01, H03, H05, H06 and H18. Building H19 will serve food, but for outdoor dining, and does not require assessment.

Figure 4: Plan showing area schedules, note that north is to the right of the page



1 H - GROUND FLOOR - GFA
DC:H17-14/1 1: 600@A1



2 H - LEVEL 1 - GFA
DC:H17-14/1 1: 600@A1

3.5 Affected Receivers

As well as the noise sensitive receivers within the proposed development in Precinct 1 and 3, to the west and south, respectively, and the sites to the east, the nearest noise affected receivers from this location would be to the north. The boundary is approximately 26 m from building H05.

4 NOISE ASSESSMENT CRITERIA

Noise emissions are assessed to the boundary of the Heritage Core as shown in Figure 3, as opposed to the boundary of the whole site.

4.1 Noise Emissions

This development is in TP Zone CZ6 and Noise Zone F and subject to “Highest noise level of adjacent zones” (*EPR 2005*). The land directly to the west is in TP Zone PRZ2, Noise Zone E 50/40 dB day/night respectively. This means that the development is subject to complying with 50/40 dB(A) for day/night times. Adjacent noise zones that are different are subject to the average of the two zones, such as to the north, the noise limits are 47.5 and 37.5 dB(A).

For residential premises on the site the *Guide for NMP* states:

Where a residential development is proposed in an area with a noise standard higher than zone G, the development must meet the ‘satisfactory’ recommended design sound levels for residential buildings of AS/NZS 2107. Commercial accommodation developments should meet AS/NZS 2107 for sleeping areas.

Table 2: From Environmental Protection Regulation 2005, version effective 24 February 2016, Schedule 2 Tables 2.1 and 2.2 combined

Table 2.1			Table 2.2	
Noise Zone	ACT Land	NSW Land	noise standard (dB(A)) Mon-Sat 7am-10pm, Sun & public holiday 8am-10pm	noise standard (dB(A)) Mon-Sat 10pm-7am, Sun & public holiday 10pm-8am
A	land in an industrial zone	land in the Queanbeyan city industrial zone	65	55
B	land in the city centre and town centres	land in the Queanbeyan city business zone	60	50
	land in the Central National Area (City Hill Precinct)			
C	land in group centres, corridor sites and office sites		55	45
	land in the Central National Area (Parliamentary Zone and Other Areas)			
D	land (other than land in the city centre, town centres and group centres) in a commercial CZ4 zone		50	35
E	land (other than land in the city centre, town centres and group centres) in— <ul style="list-style-type: none"> • restricted access recreation zone • broadacre zone 		50	40

F	land (other than land in the city centre, town centres and group centres) in— <ul style="list-style-type: none"> • commercial CZ5 zone • TSZ2 services zone • Community facility zone leisure and accommodation zone 	land in the Queanbeyan city special uses zone	same as the noise standard for the adjoining noise zone with the loudest noise standard for the time period	
G	all other land, other than land in the Central National Area (Fairbairn)	all other NSW land	35	30

4.2 Summary of Criteria

Below is a summary of the criteria discussed above:

Table 3: Summary of Criteria

Location where assessed	Criteria	Time Applicable	
		noise standard (dB(A)) Mon-Sat 7am-10pm, Sun & public holiday 8am-10pm	noise standard (dB(A)) Mon-Sat 10pm-7am, Sun & public holiday 10pm-8am
External to development at the boundary	Noise Zone G to the north and east average of the two zones	47.5	37.5
	To the west and south Noise Zone F 'Highest noise level of adjacent zones'	50	40

Note that 'day time' and 'night time' in this report is the same as that in the *EPR* as above.

5 Noise Management Plan

A summary of this section is provided at the end of the section.

We have assessed the noise levels from commercial activities in the various buildings as identified in Table 1. These have been assessed at the nearest boundary as per Figure 2.

Note that where the directionality is 'adjusted' we have reduced the area of glazing/doors to allow for directionality from various elevations. 3dB = 50% of glazing/doors and 6dB = 25% of glazing/doors.

The following assessments have been made with doors closed (as in an airlock) but also with doors open, to simulate no air lock and open.

Door sizes have been given in table heading (captions). Where the criteria has been met by a substantial margin, openings can be increased substantially and can be further addressed at Building Approval stage.

5.1 Noise emissions from H01 Noisy Usage

5.1.1 Doors Closed

The nearest receivers are residential within Precinct 1 to the west with doors closed.

Table 4: Noise emissions from H01 with doors closed

Building	Condition	Formula / notes	Values in formulae	dB
H01 Staffordshire Ground floor or first floor	Internal SPL	Minimum requirement by EPA		85.0
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 166.95	22.2
	Directionality		3	-3.0
	Attenuation through façade glazing	$SPL_{outside} =$ $SPL_{inside} - R - 6$	R = 35	-41.0
	Attenuation through Distance	$= 10 \cdot \log(2 / (4 \cdot \pi \cdot r^2))$	r = 33.5	-35.5
	Total	simple addition		27.8
	Criteria at Boundary to Precinct 1 Night time			
Criteria at Boundary to Precinct 1 Day time				47.5

The criteria are met for daytime and night time.

If both floors are occupied by noisy use occupants noise levels will be 3 dB higher at the boundary and still within the criteria.

5.1.2 Doors Open

Table 5: Noise emissions from H01 with Doors of 4.8m² open

Building	Condition	Formula / notes	Values in formulae	dB
H01 Staffordshire	Internal SPL	Minimum requirement by EPA		85.0
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 4.8	6.8
	Directionality		3	-3.0
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside}$ - R - 6	R = 0	-6.0
	Distance	$10 \cdot \log(2 / (4 \cdot \pi \cdot r^2))$	r = 33.5	-35.5
	Total	simple addition		47.3
	Criteria at Boundary to Precinct 1 Night time			

Criteria at Boundary to Precinct 1 Day time	47.5
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This scenario does not comply with the night time criteria, but does comply with the daytime criteria.

5.1.3 Recommendations H01

1. No requirements for daytime operations;
2. Night time operations will require management principles. PA system to be under control of management only, if installed;
3. Amplified music to be calibrated at the appropriate boundary as identified in table above.

5.2 Noise emissions from H03 Ground Floor to East

5.2.1 With Doors Closed

Table 6: Noise emissions from H03 Ground Floor

Building	Condition	Formula / notes	Values in formulae	dB	
H03 Ground floor	Internal SPL	Minimum requirement by EPA		85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 72.95	18.6	
	Directionality		-3	-3.0	
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R = 35	-41.0	
	Attenuation through Distance	$10 \cdot \log(2 / (4 \cdot \pi() \cdot r^2))$	r = 33.5	-35.5	
	Total	simple addition		24.2	
	Criteria at Boundary to Precinct 1 Night time				37.5
	Criteria at Boundary to Precinct 1 Day time				47.5

The criteria are met for daytime and night time.

If both floors are occupied by noisy use occupants noise levels will be 3 dB higher at the boundary and within the criteria.

5.2.2 Open Doors

Table 7: Noise emissions from H03 Ground Floor, doors of 4.8m² open

Building	Condition	Formula / notes	Values in formulae	dB	
H03	Internal SPL	Minimum requirement by EPA		85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 4.8	6.8	
	Directionality		-3	-3.0	
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R = 0	-6.0	
	Attenuation through Distance	$10 \cdot \log(2 / (4 \cdot \pi() \cdot r^2))$	r = 33.5	-35.5	
	Total	simple addition		47.3	
	Criteria at Boundary to Precinct 1 Night time				37.5
	Criteria at Boundary to Precinct 1 Day time				47.5

This scenario does not comply with the night time criteria, but does comply with the daytime criteria.

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5.2.3 Recommendations H03

4. No requirements for daytime operations;
5. Night time operations will require management principles. PA system to be under control of management only, if installed;
6. Amplified music to be calibrated at the appropriate boundary as identified in table above.

5.3 Noise emissions from H03 Ground Floor to North

5.3.1 With Doors Closed

Table 8: Noise emissions from H03 Ground Floor to North

Building	Condition	Formula / notes	Values in formulae	dB	
H03	Internal SPL	Minimum requirement by EPA		85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 36.475	15.6	
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R = 35	-41.0	
	Attenuation through Distance	$10 \cdot \log(2 / (4 \cdot \pi \cdot r^2))$	r = 33.5	-35.5	
	Barrier calculation	Makeawa method $E_b = 10 \log(3 + 40\delta/\lambda)$ dB	δ = sum of path lengths λ = wavelength (500 Hz)	-21.0	
	Total	simple addition		3.1	
	Criteria at northern boundary Night time				37.5
	Criteria at northern boundary Day time				47.5

Barrier calculation takes into account the affect of building H05 on noise propagation to the north

The criteria are met by a substantial margin.

5.3.2 Open Doors

Table 9: Noise emissions from H03 Ground Floor to North with Doors of 4.8m² open

Building	Condition	Formula / notes	Values in formulae	dB	
H03	Internal SPL	Minimum requirement by EPA		85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 4.8	6.8	
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R = 0	-6.0	
	Attenuation through Distance	$10 \cdot \log(2 / (4 \cdot \pi \cdot r^2))$	r = 33.5	-35.5	
	Barrier calculation	Makeawa method $E_b = 10 \log(3 + 40\delta/\lambda)$ dB	δ = sum of path lengths λ = wavelength (500 Hz)	-21.0	
	Total	simple addition		29.3	
	Criteria at northern boundary Night time				37.5
	Criteria at northern boundary Day time				47.5

This condition with doors open complies with the criteria for day and night time periods..

5.4 Noise emissions from H05 Ground Floor to Northern Receivers

5.4.1 Doors Closed

This building has been calculated differently to the other buildings because of the proximity of the building to the boundary.

Noise from each window opening was calculated to the one compliance location on the northern boundary, the noise levels were then anti – logged and added up and multiplied by $10 \times \log(x)$.

Table 10: Noise emissions from H05 Ground Floor to northern boundary

From west to east	Window dimensions (m)		Area (m ²)	10logS (dB)	Distance (m)	Attenuation with distance (dB)	Noise inside (dB(A))	Attenuation with 6/12/6 DG (dB)	Total (dB)	antilog	sum at receiver (dB(A))
1	2	2.2	4.4	6.435	38	-39.6	85	-41	10.9	12.18	
2	2	0.9	1.8	2.553	36	-39.1	85	-41	7.4	5.55	
3	2	1.7	3.4	5.315	32	-38.1	85	-41	11.2	13.27	
4	2	0.9	1.8	2.553	30	-37.5	85	-41	9.0	8.00	
5	2	1.7	3.4	5.315	28	-36.9	85	-41	12.4	17.34	
6	2	0.9	1.8	2.553	26	-36.3	85	-41	10.3	10.65	
7	2	1.7	3.4	5.315	27	-36.6	85	-41	12.7	18.65	
8	2	0.9	1.8	2.553	28	-36.9	85	-41	9.6	9.18	
9	2	1.7	3.4	5.315	30	-37.5	85	-41	11.8	15.10	
10	2	0.9	1.8	2.553	32	-38.1	85	-41	8.5	7.03	
									Sum	116.94	20.7
Criteria at northern boundary Night time											37.5
Criteria at northern boundary Day time											47.5

With the doors on the northern facade closed the criteria during the day and night are met.

5.4.2 H05 with southern doors open

Table 11: Noise emissions from H05 Ground Floor to Eastern Receivers with southern doors open

Building	Condition	Formula / notes	Values in formulae	dB	
H05	Internal SPL	as required by EPA		85.0	
Ground and Level 1	Convert to SWL	$10 \times \log(S)$ S = Area of glazing	S = 14	11.5	
	Directionality	Already adjusted	6	-6.0	
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R = 0	-6.0	
	Attenuation through Distance	$10 \times \log(2 / (4 \times \pi \times r^2))$	r = 20	-31.0	
	Barrier calculation	Makeawa method $E_b = 10 \log(3 + 40\delta/\lambda)$ dB	$\delta =$ sum of path lengths		-27.5
			$\lambda =$ wavelength (500 Hz)		
	Total	simple addition			26.0
	Criteria at northern boundary Night time				37.5
Criteria at northern boundary Day time				47.5	

This meets the criteria during the night and day time periods.

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5.4.3 Recommendations H05

- Doors on northern façade to be kept permanently closed, or if required for safety reasons such as emergency egress, to be alarmed and signposted.

5.5 Noise emissions from H06 Ground Floor to Eastern Receivers

These receivers are internal to the development as shown in Figure 3 on the eastern side of the quarry.

5.5.1 With Doors Closed

Table 12: Noise emissions from H06 Ground Floor to eastern boundary

Building	Condition	Formula / notes	Values in formulae	dB	
H06	Internal SPL	Minimum requirement by EPA		85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 13.695	11.4	
	Directionality		-3	-3.0	
	Attenuation through façade glazing	$SPL_{\text{outside}} = SPL_{\text{inside}} - R - 6$	R = 36	-42.0	
	Attenuation through Distance	$10 \cdot \log(2/(4 \cdot \pi() \cdot r^2))$	r = 33.5	-35.5	
	Total	simple addition		16.9	
	Criteria eastern boundary Night time dB(A)				40.0
	Criteria eastern boundary Night time dB(A)				50.0

The criteria are met for the daytime and night time periods.

5.5.1 Open Doors

Table 13: Noise emissions from H06 Ground Floor with Doors of 4.8m² open

Building	Condition	Formula / notes	Values in formulae	dB	
H06	Internal SPL	Minimum requirement by EPA		85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S = 4.8	6.8	
	Directionality		-3	-3.0	
	Attenuation through façade glazing	$SPL_{\text{outside}} = SPL_{\text{inside}} - R - 6$	R = 0	-6.0	
	Attenuation through Distance	$10 \cdot \log(2/(4 \cdot \pi() \cdot r^2))$	r = 33.5	-35.5	
	Total	simple addition		47.3	
	Criteria eastern boundary Night time dB(A)				40.0
	Criteria eastern boundary Day time dB(A)				50.0
	Criteria at Boundary to Precinct 1 Night time				37.5
Criteria at Boundary to Precinct 1 Day time				47.5	

The criteria are met during the day time periods for both boundaries

5.5.2 Recommendations H06

1. No requirements for daytime operations;
2. Night time operations will require management principles. PA system to be under control of management only, if installed;
3. Amplified music to be calibrated at the appropriate boundary as identified in table above.

5.6 Noise emissions from H18 to Eastern Receivers

These receivers are internal to the development as shown in Figure 3 on the eastern side of the quarry.

Table 14: Noise emissions from H18 Ground Floor to eastern boundary

Receiver location within the development to the east						
Building	Condition	Formula / notes	Values in formulae		dB	
H18 Ground and Level 1	Internal SPL	Minimum requirement by EPA			85.0	
	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S =	103.875	20.2	
	Directionality	Already adjusted		0	0.0	
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R =	35	-41.0	
	Barrier calculation	Makeawa method $E_b = 10 \log(3 + 40\delta/\lambda)$ dB	$\delta =$	sum of path lengths	-7.0	
			$\lambda =$	wavelength (500 Hz)		
	Attenuation through Distance	$10 \cdot \log(2/(4 \cdot \pi \cdot r^2))$	r =	5	-19.0	
	Total	simple addition			38.2	
	Criteria at Boundary to Precinct 1 Night time					37.5
	Criteria at Boundary to Precinct 1 Day time					47.5

The criteria are met during the daytime only.

5.6.1 Open Doors

Table 15: Noise emissions from H18 Ground Floor to eastern boundary with Doors of 3.3m² open

Building	Condition	Formula / notes	Values in formulae		dB
H18	Internal SPL	Minimum requirement by EPA			85.0
Ground and Level 1	Convert to SWL	$10 \cdot \log(S)$ S = Area of glazing	S =	3.3	5.2
	Directionality			6	-6.0
	Attenuation through façade glazing	$SPL_{outside} = SPL_{inside} - R - 6$	R =	0	-6.0
	Barrier calculation	Makeawa method $E_b = 10 \log(3 + 40\delta/\lambda)$ dB	$\delta =$	sum of path lengths	-7.0
$\lambda =$			wavelength (500 Hz)		

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Attenuation through Distance	$10 \cdot \log(2/(4 \cdot \pi \cdot r^2))$	r = 13	-27.3
Total	simple addition		43.9
Criteria at Boundary to Eastern Boundary Night time			37.5
Criteria at Boundary to Eastern Boundary Day time			47.5

The criteria are not met during the day or night with doors open.

5.6.2 Recommendations H18

1. All operations will require management principles. PA system to be under control of management only, if installed;
2. Amplified music to be calibrated at the appropriate boundary as identified in table above.

5.7 Summary

Below is a summary of our calculations.

Table 16: Summary of Noise Emissions Vs Criteria

Building	Compliance Location - Boundary	Criteria (dB) Day/Night	With doors closed		With Doors Open*	
			Noise at receiver dB(A)	Criteria Met	Noise at receiver dB(A)	Criteria Met
H01	West	50/40	28	Day and Night	47	Day
H03	East	47.5/37.5	24	Day and Night	47	Day
H03	North	47.5/37.5	3	Day and Night	29	Day and Night
H05	North	47.5/37.5	21	Day and Night	26	Southern doors only open Day and Night
H06	East	47.5/37.5	17	Day and Night	47	Day
H18	East	47.5/37.5	38	Day	44	Day

6 RECOMMENDATIONS

The recommended acoustic treatments are required to ensure compliance with the relevant criteria.

The following buildings only may be used for 'noisy uses' H01, H03, H05, H06, H18 only. The noisy uses are 'drinking establishment', 'indoor recreation facility', and 'restaurant'. Other buildings may not be used for these purposes under this noise management plan. These recommendations apply to these buildings only.

The assessment has been performed with an internal noise level of 85 dB(A). Any of the buildings listed above may be used for 'drinking establishment', 'indoor recreation facility', and 'restaurant' with the noise controls listed under each calculation.

6.1 Planning

There is no reason due to noise that the indoor areas could not be used for any other use.

The following lease clause will be inserted into the Crown Lease and read:

NOISE MANAGEMENT PLAN

That the Lessee, at the cost of the Lessee, shall to the satisfaction of the Environment Protection Authority (EPA) or its successor(s), comply with the requirements set out in the Noise Management Plan (NMP) prepared by Paradigm 42 Pty Ltd, version 3 dated 1 May 2023, or any NMP that replaces these documents, as endorsed in writing by the Environment Protection Authority (EPA) or its successor;

MISCELLANEOUS APPLICATION ENCUMBRANCE

2. The applicant/lessee must prepare, in coordination with the Environment Protection Authority, a MISCELLANEOUS APPLICATION ENCUMBRANCE (MAE) for registration at Access Canberra Land Titles against the Crown lease of Block Section Suburb . At a minimum, the MAE shall include a copy of the NMP referred to in the Crown lease.

Note: The registration of the MAE is to occur at the same time as the documents giving effect to the variation.

This is quoted verbatim. Note that we are not qualified to comment on a 'Miscellaneous Application Encumbrance' and queries should be directed to EPA, EPSDD or a planning consultant, but we understand that this needs to be submitted with the DA application.

By the inclusion of this phrase in the Crown Lease if uses change, another noise management plan can be prepared and endorsed by the EPA.

As we read it also means that compliance does not have to be achieved until a noisy use is to open in any of the allocated spaces.

6.2 Internal Noise Levels

All buildings comply at the compliance location during the daytime period, and for building H05 the northern doors are to remain closed.

Internal noise levels for the assessed buildings are to be limited to 85 dB(A) from PA systems. All music systems are to be under the control of management, and not the staff or effectively locked up.

For buildings H03, H06 and H18, if they are to be operated during the night time period, the following applies:

1. Noise limiters are to be fitted to all PA systems;
2. Noise levels are to be calibrated at the boundaries to be no higher than the criteria as established above;

6.3 Glazing Treatments

The assessment was performed with a rating for the 'glazing of R_w 35 which can normally be achieved with double glazing of 6/12/6 but should be confirmed with the glazier.

6.4 Doors

The R_w rating of doors should match glazing except for airlocks.

Doors should be fitted with acoustic seals to all four sides, and threshold plates to the floor. This may exclude sliding doors; and pivot doors.

6.5 External Wall Treatments

Calculations were conducted on the basis that minimum R_w 45 rated façade will be constructed for all of the façade that is not glazed. This will be satisfied with the masonry components that are present and is also achievable with light weight construction if required, and should be verified during the design stage of the project.

In all buildings designated noisy uses, penetrations through the façade shall be acoustically treated so as not to reduce the overall rating of the installed wall system.

6.6 Waste Collection

Commercial waste collection is to be conducted with regard to the *Commercial Waste Industry Code of Practice*.

6.7 Plant

Plant is to emit no more than the criteria as set out above in Table 3.

This should be checked prior to going to tender for the plant.