

# **Attachment B**

## **Revised Acoustic Assessment**

Wynyard Place, Maragret Street Tenancy and Level 9 and 10  
(Shell House) Development Application

Environmental Noise Impact Assessment

Project ID	20191184.1
Document Title	Environmental Noise Impact Assessment
Attention To	Brookfield Properties

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9	12/10/2020	20191184.1/1210A/R9/GW	GW		GW
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## 1 INTRODUCTION

This report presents our assessment of the potential noise impacts associated with the proposed Restaurants & Bars at Margaret Street Tenancy and Level 9 and 10 (Shell House).

In this report, we will:

- Identify noise sources associated with the use of the indoor and outdoor areas;
- Assess the potential operational noise impacts based on requirements by NSW Office Liquor and Gaming and City of Sydney Council DCP; and
- If necessary, recommend management controls and building treatments to ensure noise emissions will comply with these guidelines.

## 2 SITE DESCRIPTION AND MAJOR ACOUSTIC ISSUES

The proposed restaurants and Bars are on Ground Floor (Margaret St); Level 9 and 10 (Shell House), Wynyard Place. The tenancy will cater for up to 230 patrons across the external terrace areas as detailed in Figures below.

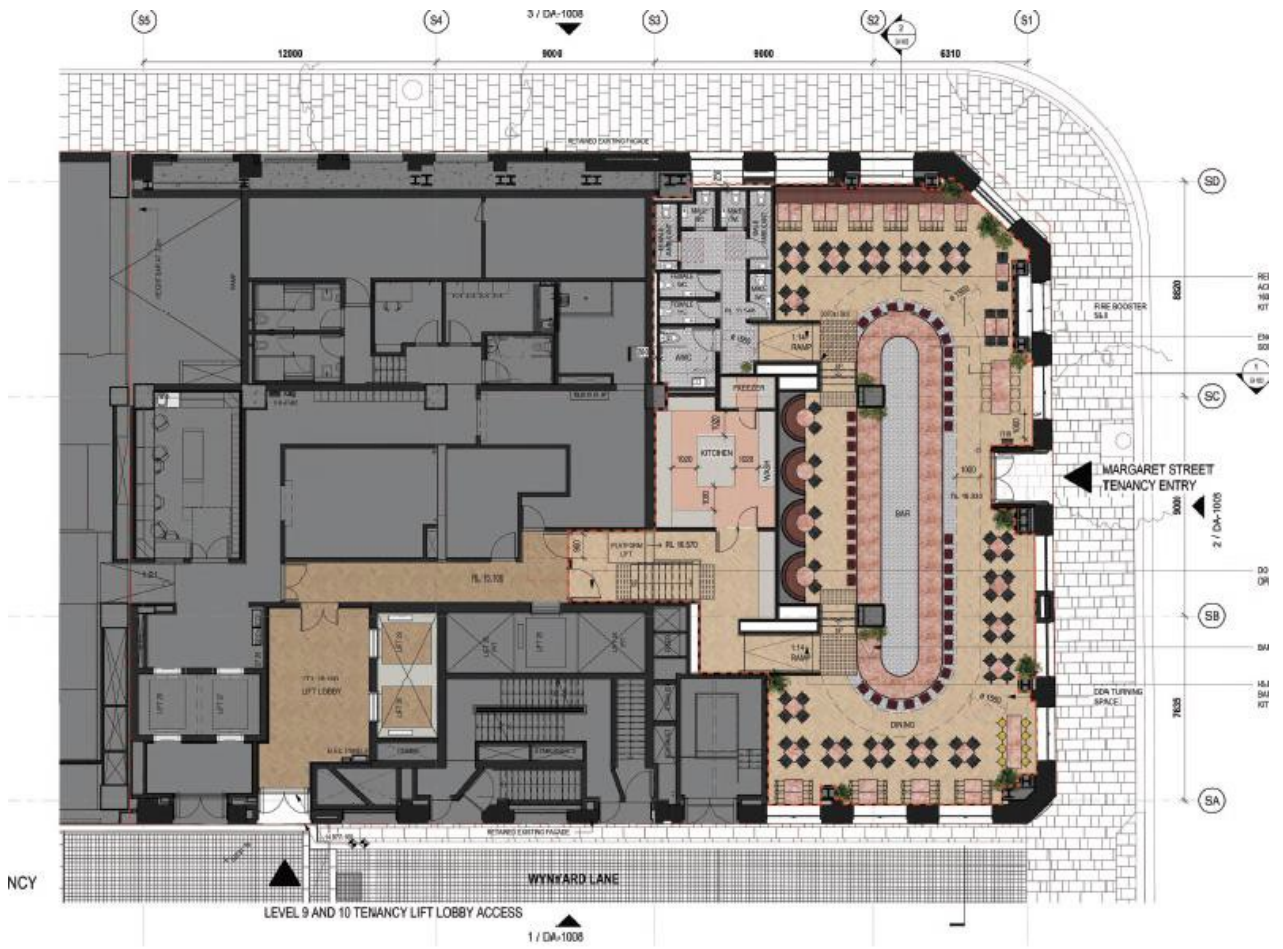


Figure 1 Margaret Street

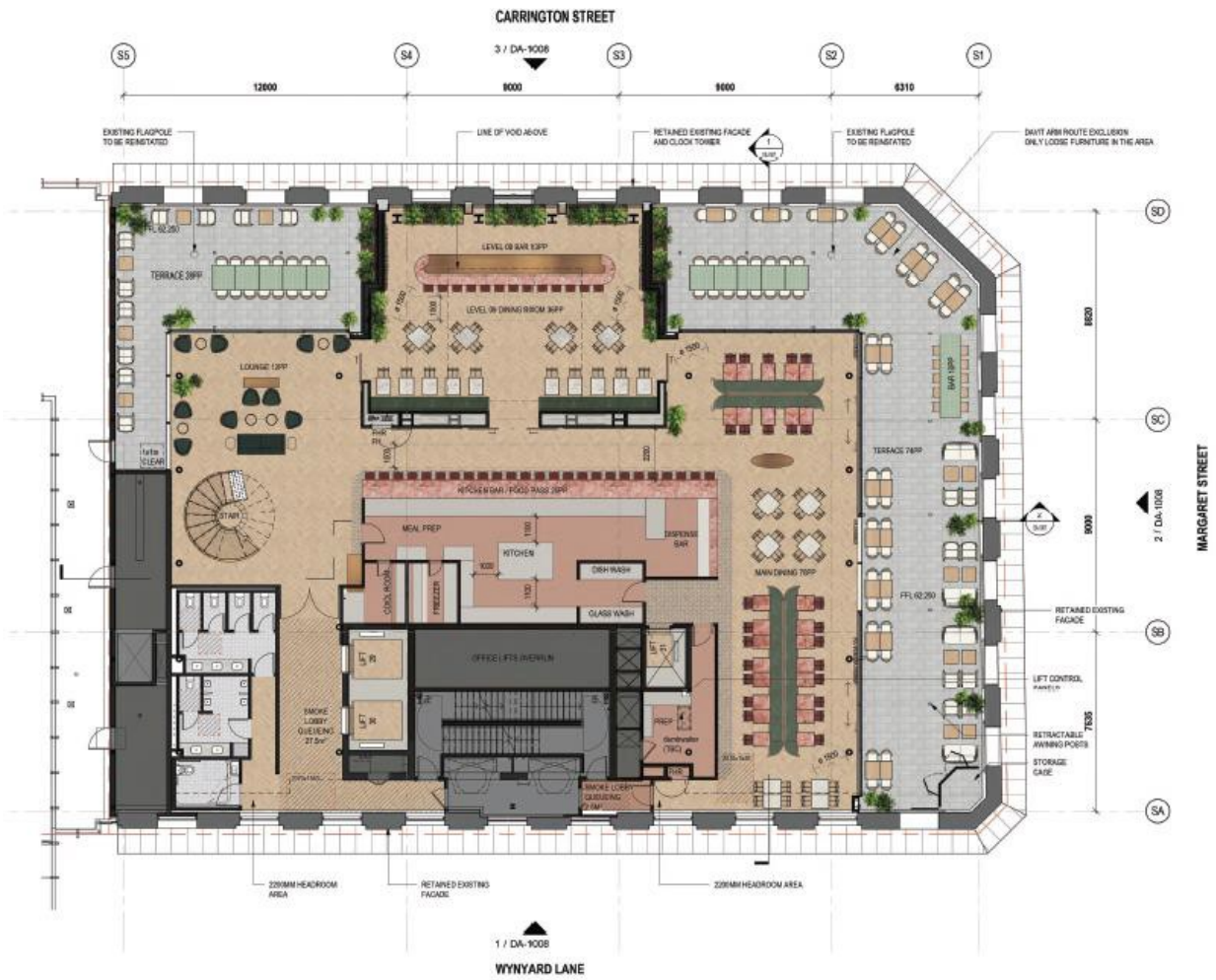


Figure 2 Level 9

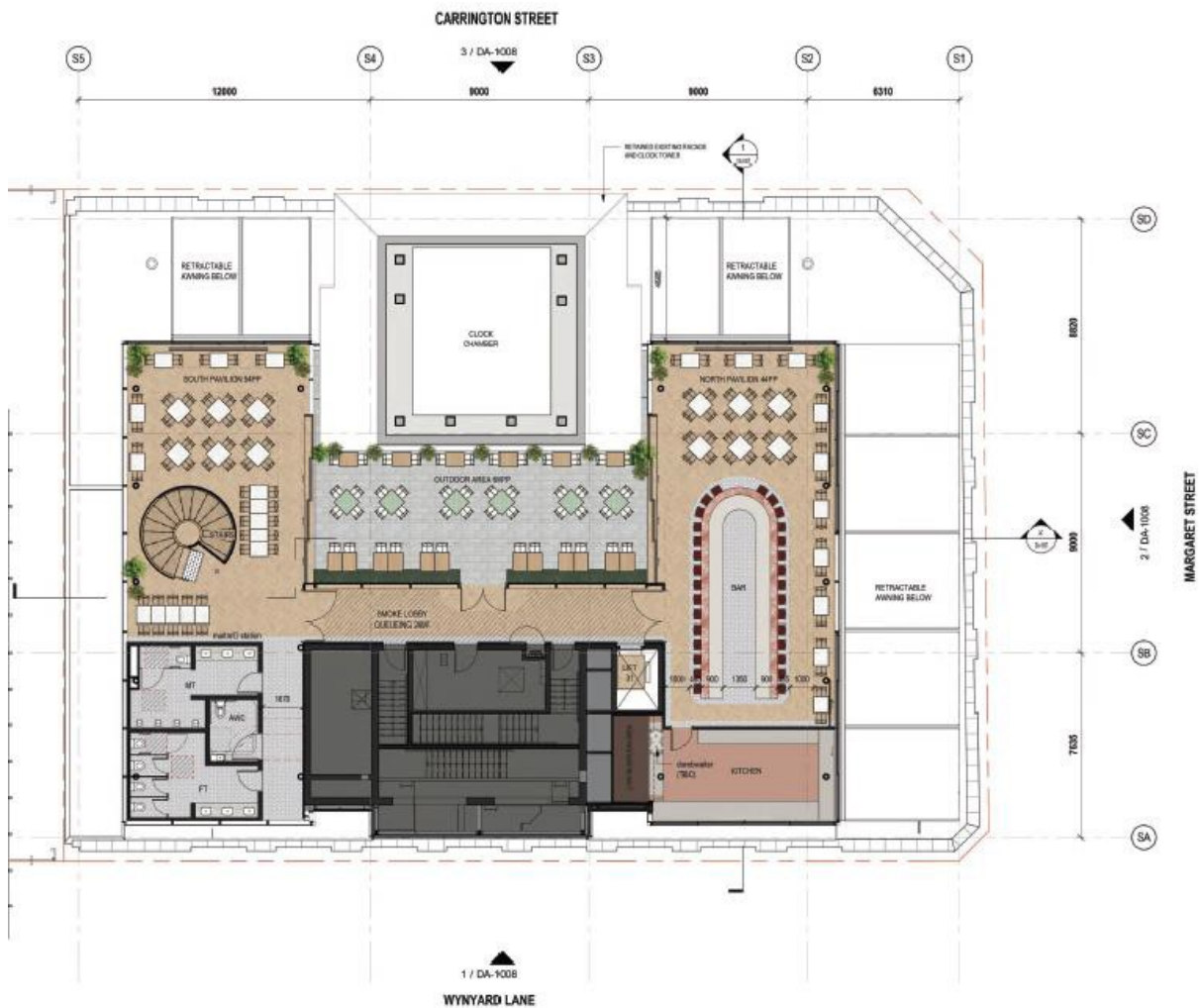


Figure 3 Level 10

Site investigation indicates that the nearest noise receivers are below:

- Receiver 1 (R1)- Travelodge Hotel with fixed facade at corner of York St and Margaret St.
- Receiver 2 (R2)- Amora Hotel with fixed facade located at 19 Jamison St.
- Receiver 3(R3)- Residential / commercial mixed-use development (under construction) at 280 George St. The horizontal distance is approximate 52m to the project boundary.
- Receiver 4 (R4)- Commercial office building located across Margaret St.
- Receiver 5 (R5)- Commercial office building located across Wynyard Lane (275 George St).
- Receiver 6 (R6)- Commercial office located directly underneath the terrace.
- Receiver 7 (R7)- Residential /commercial mixed use building at 44 Margaret St/2 York St. The horizontal distance is approximate 58m distance to the project boundary.
- Receiver 8 (R8)- Residential /commercial mixed use building (Mantra) at 254 George St. The horizontal distance is approximate 96m to the project boundary.

Detail site map is below:



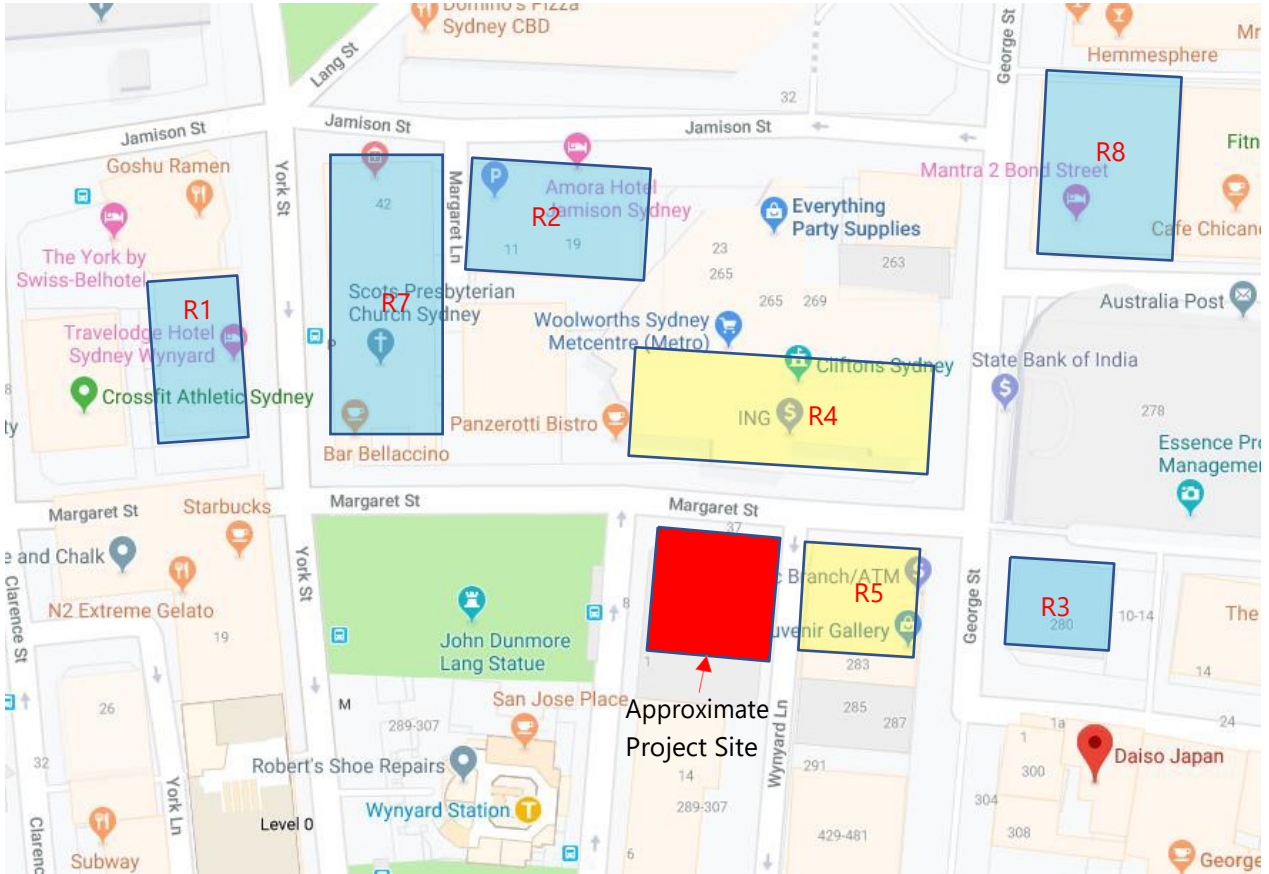


Figure 4 Site Map and Noise Receiver Location

The major noise issues related to the proposed development is below:

- Outdoor patron noise emissions
- Noise emission from the patron’s talking and background music on terrace.
- Noise emission from plant service project building.
- Indoor music and patron noise emissions.

Detailed operation is below:

**Table 1 – Operation Information**

<b>Location</b>	<b>Noise Source</b>
Margaret St	BG music +265 Patrons
Level 9 Out Door	BG music +156 Patrons
Level 9 Indoor	Loud music (from 5pm) +139 Patrons
Level 10 Outdoor	BG music +74 Patrons
Level 10 Indoor	Loud music + 211 Patrons

### 3 NOISE DESCRIPTORS

Environmental noise constantly varies in level, due to fluctuations in local noise sources including noise from nearby road traffic on surrounding roadways. Accordingly, a 15 minute measurement interval is normally utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In the case of environmental noise three principle measurement parameters are used, namely  $L_{A10}$ ,  $L_{A90}$  and  $L_{Aeq}$ .

The  $L_{A10}$  and  $L_{A90}$  measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The  $L_{A10}$  parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the  $L_{A90}$  level (*which is commonly referred to as the background noise level*) represents the noise level heard in the quieter periods during a measurement interval. The  $L_{A90}$  parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source depends on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the  $L_{A90}$  level.

The  $L_{Aeq}$  parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period.  $L_{Aeq}$  is important in the assessment of traffic noise impacts as it closely corresponds with human perception of a changing noise environment; such is the character of industrial noise.

## 4 NOISE EMISSION CRITERIA

### 4.1 REQUIREMENTS BY COUNCIL AND NSW OFFICE OF LIQUOR AND GAMING

Standard Condition from City of Sydney is below, we use this requirements for both activities' noise and plant service project site:

#### **(1) NOISE – COMMERCIAL PLANT / INDUSTRIAL DEVELOPMENT**

- (a) *Noise from commercial plant and industrial development must not exceed a project amenity/intrusiveness noise level or maximum noise level in accordance with relevant requirements of the NSW EPA Noise Policy for Industry 2017 (NPfl) unless agreed to by the City's Area Planning Manager. Further:*
  - (i) *Background noise monitoring must be carried out in accordance with the long-term methodology in Fact Sheet B of the NPfl unless otherwise agreed by the City's Area Planning Manager.*
  - (ii) *Commercial plant is limited to heating, ventilation, air conditioning, refrigeration and energy generation equipment.*
- (b) *An LAeq,15 minute (noise level) emitted from the development must not exceed the LA90, 15 minute (background noise level) by more than 3dB when assessed inside any habitable room of any affected residence or noise sensitive commercial premises at any time. Further:*
  - (i) *The noise level and the background noise level shall both be measured with all external doors and windows of the affected residence closed.*
  - (ii) *Background noise measurements must not include noise from the development but may include noise from necessary ventilation at the affected premise.*
- (c) *Corrections in Fact Sheet C of the NPfl are applicable to relevant noise from the development measured in accordance with this condition, however duration corrections are excluded from commercial noise.*

## (61) NOISE - LICENSED PREMISES

- (a) The  $L_{A10}$  noise level emitted from the use must not exceed the background noise level ( $L_{A90}$ ) in any Octave Band Centre Frequency (31.5 Hz to 8 kHz inclusive) by more than 5dB between the hours of 7.00am and 12.00 midnight when assessed at the boundary of any affected residence.
- (b) The  $L_{A10}$  noise level emitted from the use must not exceed the background noise level ( $L_{A90}$ ) in any Octave Band Centre Frequency (31.5 Hz to 8 kHz inclusive) between the hours of 12.00 midnight and 7.00am when assessed at the boundary of any affected residence.
- (c) Notwithstanding compliance with (a) and (b) above, the noise from the use must not be audible within any habitable room in any residential property between the hours of 12.00 midnight and 7.00am.
- (d) The  $L_{10}$  noise level emitted from the use must not exceed the background noise level ( $L_{90}$ ) in any Octave Band Centre Frequency (31.5 Hz to 8 kHz inclusive) by more than 3dB when assessed indoors at any affected commercial premises.
- (e) The use of the premise must be controlled so that any emitted noise is at a level so as not to create an "offensive noise" as defined in the *Protection of the Environment Operations Act 1997* to any affected receiver.

## 4.2 TO RESIDENTIAL RECEIVERS R3/R7/R8 BOUNDARY

This office has been engaged to prepare DA application of residential /commercial mixed-use development at 280 George St and the following noise emission criteria has been detailed in DA report (reference number: 20151562.1/2511A/R1/TA)

**Table 2 – Noise Emission Criteria to R3**

Time of Day	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Day (7am-6pm)	72	71	70	68	66	63	59	52	41	<b>68</b>
Evening (6pm-10pm)	70	69	68	66	64	61	57	50	39	<b>66</b>
Before Mid Night (10pm-Midnight)	68	66	65	63	61	58	54	47	36	<b>63</b>
After Midnight	65	63	62	60	58	55	51	44	33	<b>60</b>

## 4.3 TO RECEIVER R1 & R2

### 4.3.1 Internal background noise level

No access to the R1 & R2 is available, however noise measurement has been carried out within the Castlereagh Boutique Hotel by this office previously which have been used as the bases of this assessment.

The recorded background noise level within the hotel room detailed in the table below.

**Table 3 - Measured Hotel Background Noise Level**

Location	Frequency (Hz) dB									
	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
Hotel Guest Room	41	41	35	34	32	27	23	21	18	33

**4.3.1.1 To Hotel Indoor Space (R1 & R2)**

**Before Midnight**

**Table 4 – Criteria for Hotel Receivers – Acoustic Objectives dB(A)L<sub>10(15minutes)</sub> Internally Before Midnight**

F (Hz)	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
dB	44	44	38	37	35	30	26	24	21	<b>36</b>

**After Midnight**

**Table 5 – Criteria for Hotel Receivers – Acoustic Objectives dB(A)L<sub>10(15minutes)</sub> Internally After Midnight**

F (Hz)	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
dB	41	41	33	34	32	27	23	21	18	<b>33</b>

**4.4 TO COMMERCIAL RECEIVERS (R4 R5 & R6)- INDOOR SPACE**

**Table 6 – Criteria for Commercial Receivers Above – Acoustic Objectives dB(A)L<sub>10(15minutes)</sub> Internally**

Location	Time Period	31.5Hz z	63Hz	125Hz z	250Hz z	500Hz z	1kHz	2kHz	4kHz	8kHz	A-wt
Commercial Receivers	Day Time	51	51	45	44	42	37	33	31	28	<b>43</b>

Criteria for the office space above is based on the measured internal background noise level of the office space conducted by Acoustic Logic Consultancy for similar project with AC turned on. The background noise levels are also equal to recommended criteria for office space based on Australian Standard AS2107-2016.

## 5 NOISE EMISSION ASSESSMENT

### 5.1 ACTIVITY NOISE

Primary noise sources associated with the proposed terrace, with the potential to cause impacts on surrounding sensitive receivers are;

- Vocal noise of patrons within the terrace which will include up to 238 patrons across the external terrace areas as detailed in Figure 1 above.
- The expected noise level from atmosphere within the facility includes the playing of recorded amplified music.

#### 5.1.1 Outdoor Sitting Noise

Typical patrons' noise within reverberate space has been measured by this office and detailed below:

**Table 7 – L<sub>10</sub> Sound Power Level of a Patron outdoors**

<b>Noise Level dB – Frequency (Hz)</b>									
<b>31.5</b>	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1k</b>	<b>2k</b>	<b>4k</b>	<b>8k</b>	<b>A-wt</b>
66	66	73	74	79	76	72	63	51	81

For the purpose of this assessment the following assumptions have been included in our assessment:

- The tenancy will be filled to capacity at any time of the proposed operational times.
- Acoustic treatments and management controls recommended in section 7 below.

### 5.1.2 Background Music Noise

Typical background music within outdoor space has been measured by this office as below:

**Table 8 – L<sub>10</sub> Sound Pressure Level of BG Music**

Noise Level dB – Frequency (Hz)									
31.5	63	125	250	500	1k	2k	4k	8k	A-wt
52	69	79	67	72	73	69	64	59	74

### 5.1.3 Internal Loud Music + Patrons' Noise

The internal loud music and patrons' noise measured within Northies Cronulla have been adopted to simulate the operational noise levels within the proposed indoor areas. The sound pressure level is below.

**Table 9 – L<sub>10</sub> Sound Power Level of Internal Loud Music and Patron Noise**

Noise Level dB – Frequency (Hz)									
31.5	63	125	250	500	1k	2k	4k	8k	A-wt
85	103	105	99	94	92	90	86	86	98

## 6 NOISE PREDICTION

### 6.1 PREDICTED NOISE LEVELS TO INTERNAL SPACE OF R1

Minimum 6mm thick glazing has been assumed for the facade of receiver, the predicted internal noise levels are below.

#### 6.1.1 Before Midnight

**Table 10 – Predicted Noise Level to R1 dBL<sub>10</sub> Before Midnight**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	34	34	29	24	24	15	15	<10	<10	24
Criteria	44	44	38	37	35	30	26	24	21	36
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.1.2 After Midnight

**Table 11 – Predicted Noise Level to R1 dBL<sub>10</sub> After Midnight**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	34	34	27	13	<10	<10	<10	<10	<10	< 20
Criteria	41	41	33	34	32	27	23	21	18	33
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.2 PREDICTED NOISE LEVELS TO INTERNAL SPACE OF R2

Minimum 6mm thick glazing has been assumed for the facade of receiver, the predicted internal noise levels are below.

### 6.2.1 Before Mid Night

**Table 12 – Predicted Noise Level to R2 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	36	36	31	25	26	16	16	<10	<10	26
Criteria	44	44	38	37	35	30	26	24	21	36
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

### 6.2.2 After Midnight

**Table 13 – Predicted Noise Level to R2 dBL<sub>10</sub> After Midnight**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	35	35	28	15	<10	<10	<10	<10	<10	< 20
Criteria	41	41	33	34	32	27	23	21	18	33
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	



### 6.3 PREDICTED NOISE LEVEL TO RECEIVER 3 (R3) FACADE

#### 6.3.1 Before Midnight

**Table 14 – Predicted Noise Level to R3 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	52	52	52	51	55	52	49	39	28	57
Criteria (Night)	68	66	65	63	61	58	54	47	36	63
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

#### 6.3.2 After Midnight

**Table 15 – Predicted Noise Level to R3 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	52	52	49	38	30	26	23	< 10	< 10	36
Criteria (Night)	65	63	62	60	58	55	51	44	33	60
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

### 6.4 PREDICTED NOISE LEVEL TO R4 INTERNAL SPACE

Minimum 6mm thick glazing has been assumed for the facade of receiver, the predicted internal noise levels are below.

**Table 16 – Predicted Noise Level to R4 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	49	49	44	39	40	30	30	14	< 10	39
Criteria	51	51	45	44	42	37	33	31	28	43
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.5 PREDICTED NOISE LEVEL TO R5 INTERNAL SPACE

Minimum  $R_w$  35 glazing has been specified for the facade of receiver, the predicted internal noise levels are below.

Jockey sash windows for Level 9 & Level 10 are required with additional 10.38mm glazing fixed internally.

**Table 17 – Predicted Noise Level to R5 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	51	51	42	36	36	30	24	< 10	< 10	37
Criteria	51	51	45	44	42	37	33	31	28	43
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.6 PREDICTED NOISE LEVEL TO R6 INTERNAL SPACE

Minimum 150mm concrete slab and jockey sash glazing have been used to receiver, the predicted internal noise levels are below.

**Table 18 – Predicted Noise Level to R6 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	42	42	47	36	37	28	27	13	< 10	37
Criteria	51	51	45	44	42	37	33	31	28	43
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.7 PREDICTED NOISE LEVEL TO RECEIVER 7 (R7) FACADE

### 6.7.1 Before Midnight

**Table 19 – Predicted Noise Level to R7 dBL<sub>10</sub>**

Item	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Wt.
Predicted Combined Noise Level	52	52	52	50	55	52	48	39	27	56
Criteria (Night)	68	66	65	63	61	58	54	47	36	63
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.7.2 After Midnight

**Table 20 – Predicted Noise Level to R7 dBL<sub>10</sub>**

<b>Item</b>	<b>31Hz</b>	<b>63Hz</b>	<b>125Hz</b>	<b>250Hz</b>	<b>500Hz</b>	<b>1kHz</b>	<b>2kHz</b>	<b>4kHz</b>	<b>8kHz</b>	<b>A-Wt.</b>
Predicted Combined Noise Level	51	51	48	38	30	25	23	<10	<10	35
Criteria (Night)	65	63	62	60	58	55	51	44	33	60
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 6.8 PREDICTED NOISE LEVEL TO RECEIVER 8 (R8) FACADE

### 6.8.1 Before Midnight

**Table 21 – Predicted Noise Level to R8 dBL<sub>10</sub>**

<b>Item</b>	<b>31Hz</b>	<b>63Hz</b>	<b>125Hz</b>	<b>250Hz</b>	<b>500Hz</b>	<b>1kHz</b>	<b>2kHz</b>	<b>4kHz</b>	<b>8kHz</b>	<b>A-Wt.</b>
Predicted Combined Noise Level	47	47	47	46	51	48	44	35	23	52
Criteria (Night)	68	66	65	63	61	58	54	47	36	63
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

### 6.8.2 After Midnight

**Table 22 – Predicted Noise Level to R8 dBL<sub>10</sub>**

<b>Item</b>	<b>31Hz</b>	<b>63Hz</b>	<b>125Hz</b>	<b>250Hz</b>	<b>500Hz</b>	<b>1kHz</b>	<b>2kHz</b>	<b>4kHz</b>	<b>8kHz</b>	<b>A-Wt.</b>
Predicted Combined Noise Level	47	47	44	33	25	21	19	<10	<10	31
Criteria (Night)	65	63	62	60	58	55	51	44	33	60
Comply ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

## 7 RECOMMENDATIONS FOR DESIGN & MANAGEMENT

The following building and management controls are recommended;

- Glazing on facades

**Table 23 – Glazing Facades**

Level	Facade	Glazing Details with seals
Ground	All	6mm
L9 Indoor	North/ South	9.14mm/12mm air gap/ 9.14mm
	East	6mm /12mm air gap/13.52mm
	West	6mm + Jockey Sash + 6mm
L10 Indoor	North/ South	9.14mm/12mm air gap/ 9.14mm
	East	6mm /12mm air gap/13.52mm
	West	6mm + Jockey Sash + 6mm

- Internal Music Noise Controls:

**Table 24 – Recommended Internal Music Noise Limit**

Level	Time	Music Noise Limit
Ground	Before Midnight	74 dB(A) <sub>L<sub>10</sub></sub>
	After Midnight	74 dB(A) <sub>L<sub>10</sub></sub>
Level 9 Indoor	Before Midnight	95 dB(A) <sub>L<sub>10</sub></sub>
	After Midnight	85 dB(A) <sub>L<sub>10</sub></sub>
Level 10 Indoor	Before Midnight	95 dB(A) <sub>L<sub>10</sub></sub>
	After Midnight	85 dB(A) <sub>L<sub>10</sub></sub>

- Management controls should be utilised to manage patron departure particularly at night and at closing times to ensure that patrons leaving development in a prompt and orderly manner.
- Outdoor speakers can play background music only with maximum Sound Pressure Level 74 dB(A) at 1m distance from the surface of speakers, the speakers should be positioned facing project site only.
- Management control will be carried out by the tenant to ensure that the operational noise to any residential receivers satisfies the requirements by NSW Office Liquor and Gaming and City of Sydney Council DCP at any time.
- All waste removal and deliveries will be considered in the existing waste management plan for the site and can be conducted via the existing basement area.
- All speakers and other noise generating equipment are to be vibration isolated from the building structure using Embelton NR or Supershear Flex mounts.

- Slab thickness shall be minimum 150mm, the tiled or timber floor finish shall achieve impact rating of  $L_{nTw}$  55. Footing of all furniture shall be isolate by rubber mounts. Kitchen bench should be isolated by two layers of waffle pads with metal shim in between.
- New plant service project building shall be assessed at CC stage to ensure that the overall noise emissions satisfy the requirements in Section 4.

## 8 CONCLUSION

Noise emissions have been predicted and assessed against requirements adopted by the City of Sydney Council for the proposed Restaurants and Bars at Margaret Street Tenancy and Level 9 and 10 (Shell House).

Subject to the implementation of the acoustic mitigations in Section 7 of this report being adopted there is no unacceptable noise impact associated with the proposed development in this report and the noise emissions from the use will comply with the requirements of City of Sydney Council and NSW Office of Liquor and Gaming.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read "George Wei". The signature is written in a cursive style with a large initial "G".

Acoustic Logic Consultancy Pty Ltd  
George Wei

Associate Director, MAAS