



ARCHITECTURAL ACOUSTICS

DEVELOPMENT APPROVAL REPORT

**12 HEDLAND PLACE, KARRATHA
PROPOSED NIGHTCLUB**

Rev A - 13th September 2019



For

JOANNE NELL

**12 Hedland Place
KARRATHA WA 6714**

EXECUTIVE SUMMARY

The potential noise emissions from the proposed nightclub at 12 Hedland Place have been assessed using SoundPLAN 8.0 acoustic modelling software. The assessment indicates that the noise emissions from the proposed facility has the capability of complying with the Environmental Protection (Noise) Regulations 1997. The following noise control strategies and management shall be implemented by the proponent in order to comply with the regulations:

Building Construction Requirements

- All entrances and exits to the proposed nightclub are to have dedicated acoustic lobbies installed:
 - Minimum distance between doors to be 1.2m
 - Acoustic absorption to be provided to lobby space as much as practicable, such as 50mm thick Autex Quietspace
 - Full perimeter acoustic door seals are to be provided, such as Raven RP 38 drop seals and Raven RP 10 full perimeter seals.
- A solid 2.1m high barrier to be provided to the North and South of the smokers area, with the East side barrier to meet the underside of the floor slab above.
- A solid 2.1m high barrier around the Western half of the rooftop bar area, with the Eastern side to have a 2.8m high barrier.
- Barrier to be constructed of minimum 9mm fibre cement sheeting, glass, perspex or similar with no gaps.
- Flooring of rooftop bar to be solid with no gaps for sound to flank under.

Management Requirements

- Internal noise levels in the ground floor area to be limited to no more than 92 dB(A)
- Internal noise levels in the upstairs area to be limited to no more than 82 dB(A)
- No more than 16 people at any given time in the outdoor smokers area
- The rooftop bar to be limited to 50 people after 10pm. No restrictions acoustically on capacity prior to this time.
- Management of 'bass beat' within internal music and particularly noisy patrons will be required.
- All door and windows are closed during operation.
- Glass shall only be emptied into the outside bins between the hours of 7am and 7pm (9am to 7pm on Sundays and Public Holidays).
- A log book shall be maintained for the purpose of recording and resolving noise complaints.

Report Version	Author	Notes	Date
Initial Report	Michael Ferguson		03 rd October 2018
Rev A	Michael Ferguson		13 th September 2019



Gabriels Hearne Farrell Pty Ltd is a Member Firm of the Association of Australasian Acoustical Consultants. The report author is a full member of the Australian Acoustical Society.

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1. INTRODUCTION

As requested, this report summarises all potential environmental noise issues applicable to the Development Approval stage of the proposed nightclub at 12 Hedland Place, Karratha.

This report is based upon the drawings of the existing building structure received 27th August, 2018. This report outlines the following:

- Demonstrates that the project team is aware of their Regulatory obligations with regards to noise emissions,
- Establishes the project specific Assigned Noise Level criteria in accordance with the Regulations,
- Identifies the relevant Noise Sources and the Assigned Noise Levels applicable to each source,
- Identifies acoustic issues that will be addressed in detail during design and documentation stages, to ensure compliance with the Environmental Protection (Noise) Regulations (EPNR),
- Provides an initial assessment and recommendations to ensure compliance with the EPNR.

2. ENVIRONMENTAL NOISE EMISSIONS

Noise emissions generated by the use of the proposed facilities must comply with the Environmental Protection (Noise) Regulations, 1997 (as amended Dec 2013). The criteria for noise emissions from this development to neighbouring premises are called the Assigned Noise Levels, and vary depending on time of day, receiver location, duration of the noise source etc. The site specific criteria are set out in Section 3.1 of this report.

The neighbouring highly noise sensitive premises are:

- Existing residences located to the East of the proposed development, across Hedland Place.

Our current calculations and recommendations are based upon the above mentioned properties. There are some adjacent commercial properties however it is our understanding that whilst the Assigned Noise Level technically is required to be met at these premises, these facilities are not open during the proposed operation times.

The site specific Assigned Noise Level criteria takes into account the land zoning and traffic flows within 100m and 450m of the relevant receiver locations. This has been based on the land zoning information obtained from aerial imagery:



Image 01 - Assigned Noise Level Circumferences

Land Zoning Influencing Factor

There is approximately 29% of the inner circle and that is deemed to be commercial in nature, and approximately 31% commercial properties present in the outer circle. Therefore the Influencing Factor for land use is a +3dB(A) adjustment to the Assigned Noise Levels.

Transport Influencing Factor

Typically, the amount of traffic on nearby roads has an influencing factor on the assigned noise levels. In this case however there are no Major or Secondary roads within the 100m of 450m radii. Therefore, there are no influencing factors applied to the assigned noise levels for Transport.

2.1 Assigned Noise Levels

Based on the above, there is an Influencing Factor +3dB(A) relevant to the residences in the surrounding area to the proposed development. On this basis, the regulatory Assigned Noise Level criteria to be applied to this development are:

Type of premises receiving noise	Time of day	Assigned Noise Level (dB)		
		L _{A10}	L _{A1}	L _{A max}
Noise sensitive premises; highly sensitive area (i.e. within 15m of a residential building)	0700 to 1900 hours Monday to Saturday	48	58	68
	0900 to 1900 hours Sunday and public holidays	43	53	68
	1900 to 2200 hours all days	43	53	68
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays.	38	48	58
Commercial Premises	All hours	60	75	80

Table 01 –Assigned Noise Levels

The sound level parameters used for the various environmental noise criteria are described below, based on an assessment period of 15 minutes up to 4 hours:

L_{A10} is the 'A' weighted noise level which is not to be exceeded for more than 10% of the time, e.g. for more than 10 minutes in 100 minutes. This is the parameter relevant to most HVAC equipment, and emissions from other longer term noise sources that run for extended duration (such as crowd noise, music etc.).

L_{A1} is the 'A' weighted noise level which is not to be exceeded for more than 1% of the time, e.g. for more than 1 minute in 100 minutes, or up to 24 minutes in 4 hours. This is the parameter relevant to noise sources that only occur occasionally, for short durations, (e.g. vehicle movements).

L_{Amax} is the 'A' weighted noise level for individual events (e.g. car door closes) which is not to be exceeded at any time.

2.2 Adjustments for Noise Character

Regulation 7 requires that the noise emission must be free of annoying characteristics, namely tonality (e.g. whining, droning), modulation (like a siren), and impulsiveness (e.g. thumping). Where noise emissions do exhibit the above noise characteristics, an adjustment is made to the measured/calculated noise level:

<i>Tonality</i>	5dB is added to the measured level
<i>Modulation</i>	5dB is added to the measured level
<i>Impulsiveness</i>	10dB is added to the measured level

Where the noise emission is music the following adjustments to the measured noise levels apply:

<i>Impulsiveness not present</i>	10dB is added to the measurement level
<i>Impulsiveness present</i>	15dB is added to the measurement level

The above adjustments only apply where the noise character is audible and measurable the noise receiver. In our experience music from an internal noise breakout source is typically not deemed to be impulsive. Therefore any music noise emissions for the purpose of this assessment have had a penalty of +10dB(A) applied to the noise levels calculated.

Outdoor crowd noise is generally considered to be free from tonality and/or modulation and therefore has no penalties applied to it.

3. NOISE SOURCES

All noise emissions from the proposed development are to be in full compliance with the requirements of the Environmental Protection (Noise) Regulations 1997. All noise generated by the various activities and building services must meet the Assigned Noise Levels at neighbouring premises, as determined by the Regulations. Noise sources to be addressed include:

- Indoor breakout of music through the building fabric
- Outdoor crowd noise from proposed smokers area
- Outdoor crowd noise from proposed rooftop bar area
- Outdoor crowd noise from entrance line
- Mechanical units (e.g. condensing units / exhaust fans / air compressors etc.)*

At this stage we have assumed that the existing mechanical and air-conditioning systems will remain 'as is'. Therefore these have not been assessed as it is assumed compliance is already achieved at all times of the day.

We have been advised by the client that the proposed nightclub will operate from 9pm to 3am.

Vehicle Movements

It should be noted that the parking area available for the nightclub patrons is open to the public. It is therefore our understanding that the main trafficable areas are considered 'road'. In accordance with clause 3 of the EPNR:

1) *Nothing in these regulations applies to the following noise emissions-*

a) *noise emissions from the propulsion and braking systems of motor vehicles operating on a road;*

Therefore propulsion and braking noise associated with vehicle movements has not been assessed.

Waste Collection & Site Cleaning

Waste collection and other similar works are covered by Regulation 14A of the EPNR. The regulation states that the collection of rubbish etc. is exempt from meeting the regulations, provided that:

a) *the works are carried out in the quietest reasonable and practicable manner; and*

b) *the equipment used to carry out the works is the quietest reasonably available; and*

c) *is carried out during day time hours, defined as 7am to 7pm Monday to Saturday, and 9am to 7pm Sundays and Public Holidays.*

3.1 EPNR Noise Specific Criteria

Based on the above, the relevant EPNR criteria are shown against the noise emissions listed above. The most stringent Assigned Noise Level criteria applicable to these periods will therefore be applied (as seen below).

Noise Emissions from Music Breakout		
	Time of Day	Relevant Assigned Noise Level
Daytime - Monday to Saturday	7am to 7pm	L _{A10} 48 dB(A)
Daytime - Sundays & Public Holidays	9am to 7pm	L _{A10} 43 dB(A)
Evening - All Days	7pm to 10pm	L _{A10} 43 dB(A)
Overnight - All Days	All other times from above	L _{A10} 38 dB(A)

Table 02 - Relevant Assigned Noise Levels - Music Breakout

Noise Emissions from Outdoor Crowd Noise		
	Time of Day	Relevant Assigned Noise Level
Daytime - Monday to Saturday	7am to 7pm	L _{A10} 48 dB(A)
Daytime - Sundays & Public Holidays	9am to 7pm	L _{A10} 43 dB(A)
Evening - All Days	7pm to 10pm	L _{A10} 43 dB(A)
Overnight - All Days	All other times from above	L _{A10} 38 dB(A)

Table 03 - Relevant Assigned Noise Levels - Mechanical Plant

The noise assessment calculations below have been performed with SoundPLAN 8.0 noise modelling software and is based upon the following assumptions:

- The construction of the existing roof / ceiling systems is steel roof sheeting with a layer of sisilation under, approximately 900mm air gap, suspended 13mm flush plasterboard with 75mm fibreglass insulation over.
- The side of the roof system where it returns down is steel roof sheeting with sisilation under, approximately 250mm air gap, fixed 13mm flush plasterboard with 75mm fibreglass over.
- The glazing is assumed to be 14.52mm thick security glass based on the drawings and discussions with the client.
- The upstairs window sill box is constructed of 7mm fibre cement sheeting externally with 10mm flush plasterboard or 18mm particle board. No insulation in cavity space.
- Suspended concrete floor slab to be minimum 220mm thick
- External walls to be minimum two layers of 90mm concrete blockwork with wall ties.
- No fresh air ventilation paths etc. downgrading the performance of the above mentioned building structures.
- The current location of houses and surrounding buildings.

3.2 Noise Sources Used in Modelling

Based on in house data and other previous measurements, the following noise sources have been used in the modelling process:

Sound Power Level of Noise Sources								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	dB(A)
Music at inside face of downstairs construction	99.0	101.5	97.5	90.5	88.5	87.5	76.5	95.0
Music at inside face of upstairs construction	89.0	91.5	87.5	80.5	78.5	77.5	66.5	85.0
Crowd noise - Smokers area (16ppl - half talking)	67	68	78	85	83	77	73	86.6
Crowd noise - Rooftop area (50ppl - third talking)	70	71	81	88	86	80	76	89.6
Crowd noise - Entrance line (10ppl - half talking)	65	66	76	83	81	75	71	84.5

Table 04 - Sound Power Level of Noise Sources used in the Modelling Procedure

Crowd Noise

The noise level information used in the modelling procedure is based upon an individual patron talking with a raised voice level of 66 dB(A) at 1m (as per Australian Standard 2822). We have estimated that the outdoor smokers area will have a maximum 16 patrons at any given point in time. Half of these have been assumed to be talking with a raised voice at the same time.

The entrance line at the front of the nightclub has been assumed to have no more than 10 people at any given point in time. Similarly to above it is assumed that half are talking with a raised voice at the same time.

Due to the different nature of the proposed rooftop bar area (i.e. general bar area is typically different from a smokers yard or entrance line), the rooftop area has been modelled with one third of occupants talking at the same time. The total number of people allowed for in this area is 50 i.e. 16 people talking at the same time.

All outdoor crowd areas have been modelled at a height of 1.4m above ground level to represent people standing.

3.3 Penalties Applied to Noise Sources

As per Section 2.2 of this report, any 'annoying' characteristics of noise emissions from the proposed development are subject to penalties. Based on our experience, and in the interest of being conservative, the following penalties have been applied to the above noise sources:

- | | | |
|-----------------------|-----------------------|-----------|
| • Music Breakout | Music (not impulsive) | +10 dB(A) |
| • Outdoor crowd noise | No penalty applied | +0 dB(A) |

4. MODELLING METHODOLOGY

The noise emissions from the proposed nightclub have been modelled using the *SoundPLAN* v8.0 software with the *Concawe* algorithm. This software allows the input of topographical data, building heights and forms, meteorological conditions, and noise source data. The software produces noise contour plans, indicating the predicted noise level over a given area.

Note – the output noise levels from *SoundPLAN* are base noise levels not including adjustment for noise character.

4.1 Meteorological Conditions

The meteorological conditions used in the calculations were as follows (based on the requirements of the Department of Environment Regulation):

Day-time Assessment

- Temperature – 20°C
- Relative Humidity – 50%
- Wind – 4 m/s in all directions simultaneously
- Pasquil Stability Class - E

Night-time Assessment

- Temperature – 15°C
- Relative Humidity – 50%
- Wind – 3 m/s in all directions simultaneously
- Pasquil Stability Class - F

4.2 Topography and Building Form

The building form, height, and configuration were input into the noise model, based on the architectural drawings and the information available on the Landgate mapping system.

All roads and carpark areas were input into the noise model as hard reflecting ground surface.

5. RESULTS OF ACOUSTIC MODELLING

5.1 Noise Breakout from Internal Music

In discussions with the client it was agreed that the down stairs area of the proposed nightclub will be the main dance floor and DJ / bar area, whilst the upstairs area will be a quieter area reserved more for conversational purposes. With this in mind the internal noise level allowed for in the two areas is approximately 95 dB(A) downstairs and 85 dB(A) upstairs. We feel this prediction is a relatively accurate prediction of the expected scenario, especially based on a stairwell void between the two zones.

Based on the above the modelled noise breakout results are as follows:

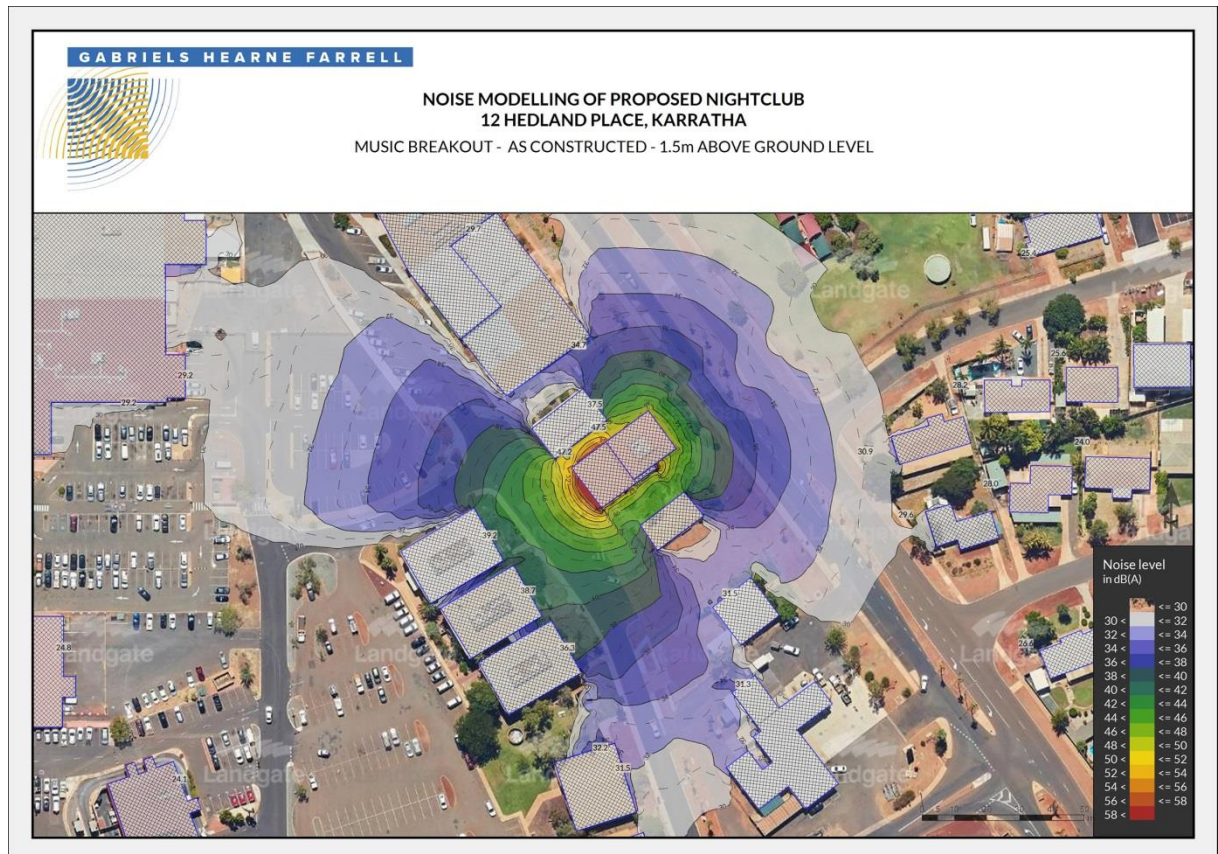


Image 02 - Noise Breakout from Music

At the most affected receiver position (i.e. the closest residence) the predicted noise level is approximately 31 dB(A). after applying penalties for music noise this increases to approximately 41 dB(A). This exceeds the night time Assigned Noise Level of 38 dB(A).

Due to the minimal exceedance of the Assigned Noise Level, it is our recommendation that the interior noise level is limited to 92 dB(A) downstairs and 82 dB(A) upstairs. These internal noise levels are predicted to achieve compliance at all times of the day.

Alternatively if the internal noise levels are desired to be louder than this then the building structure can be increased. It should be noted however that based on the source contribution at the closest residence (i.e. the noise level from all the individual elements e.g. roof / ceiling construction, upstairs glazing, upstairs window sill, blockwork walls etc.) the increase in construction that will be required to achieve a noticeable increase in noise level could be considered quite onerous. Information on this can be provided if required.

It is critical with all situations that low frequency 'bass beat' is adequately controlled and managed within all music played. No outdoor speakers are allowed.

It is also critical that all entrances / exits to the nightclub, particularly to the outdoor smokers area, have dedicated acoustic lobbies installed. This is to be via two sets of acoustically sealed solid doors with a minimum distance of 1.2m from one another (note more distance may be required for other purposes). Acoustic seals must be rubberised and suitable for the situation. Suitable acoustic seals are Raven RP 38

drop seals and Raven RP 10 full perimeter acoustic seals. Acoustic absorption must be provided within this lobby space, such as 50mm Autex Quietspace or similar, with as much installed as possible.

5.2 Noise Emissions from Crowd Noise

As discussed with the client the current proposal is to provide an outdoor ventilated smokers area to the rear of the property, as well as a rooftop bar area over the existing structure on the Hedland Place side of the building. Whilst the undercroft area is facing the closest noise sensitive receiver position, the rooftop bar area is partially blocked by the higher portion of the existing building. The local council have also expressed concern regarding the possible line of patrons at the front of the development waiting to enter.

As mentioned in Section 3.2 of this report, we have estimated that the outdoor smokers area will have a maximum number of 16 people at any given time. This is based on the smokers area being reserved for this purpose, rather than providing this space as a typical outdoor alfresco area. Similarly we have estimated that the line at the front of the nightclub will not exceed 10 people at any given point in time.

For the purposes of these calculations we have limited the numbers of patrons on the rooftop bar area to 50 people. This is explained in more detail below.

As mentioned previously in both smoker yard and the front line we have allowed for half of the patrons talking at a raised voice level at the same time. The rooftop bar area has a third of the patrons talking at the same time as we believe people will behave slightly differently when in larger groups of people i.e. small groups of smokers and people waiting in line may talk in pairs, whereas in larger gatherings this could easily be one person talking to two other people.

The modelling results of this situation as currently constructed is as follows:

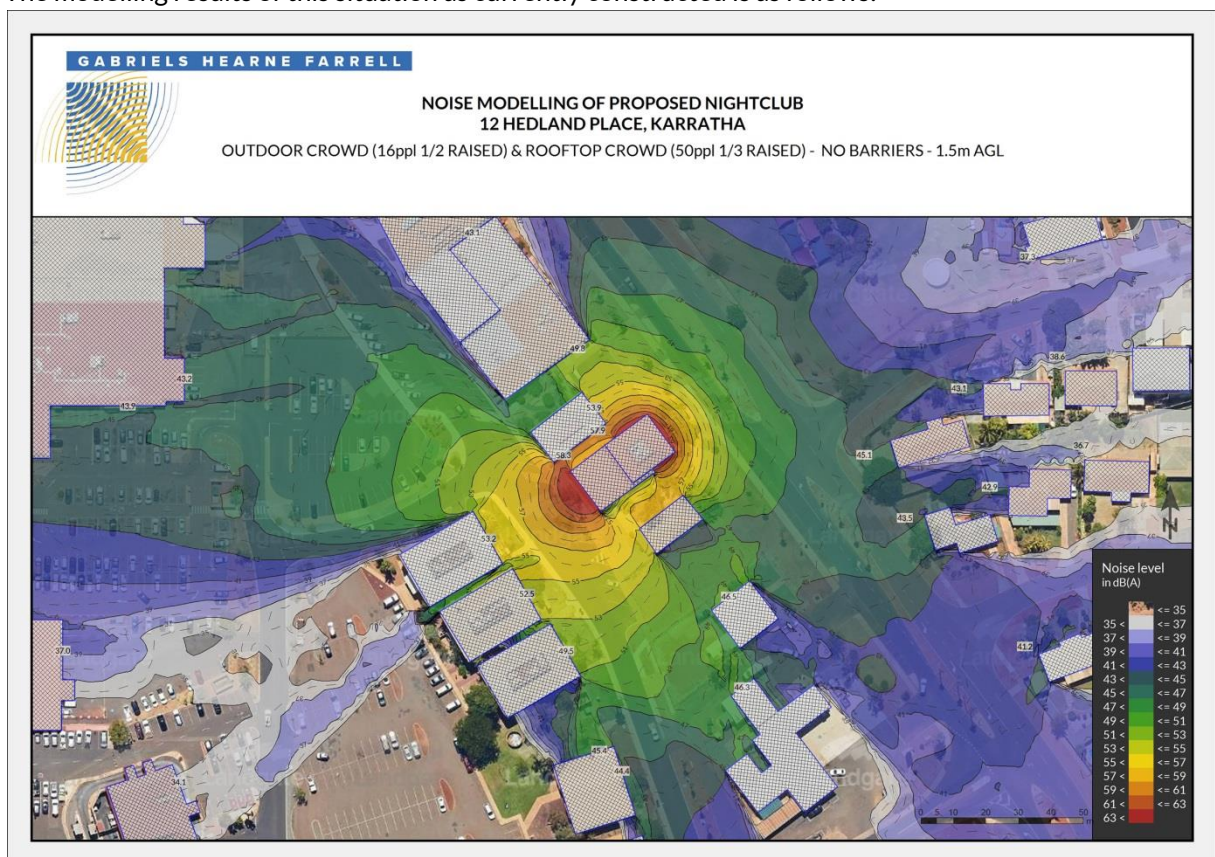


Image 03 - Noise Emissions from Outdoor Crowd Noise

The results of this modelling is currently indicating a noise level of approximately 45 dB(A) at the neighbouring noise sensitive premises. No penalties are applied to this noise source, however the night time Assigned Noise Levels are still exceeded by approximately 8 dB(A).

To attenuate this noise level at the neighbouring premises a barriers have been introduced around all sides of the outdoor smokers area, as well as the rooftop bar area. The height of these barriers are shown in the image below:



These barriers must be continuous with no gaps and be adequately sealed to the ground. Suitable materials are 9mm fibre cement sheeting or glass etc. provided the mass of the barrier is maintained.

The results of modelling with this barrier included is as follows:

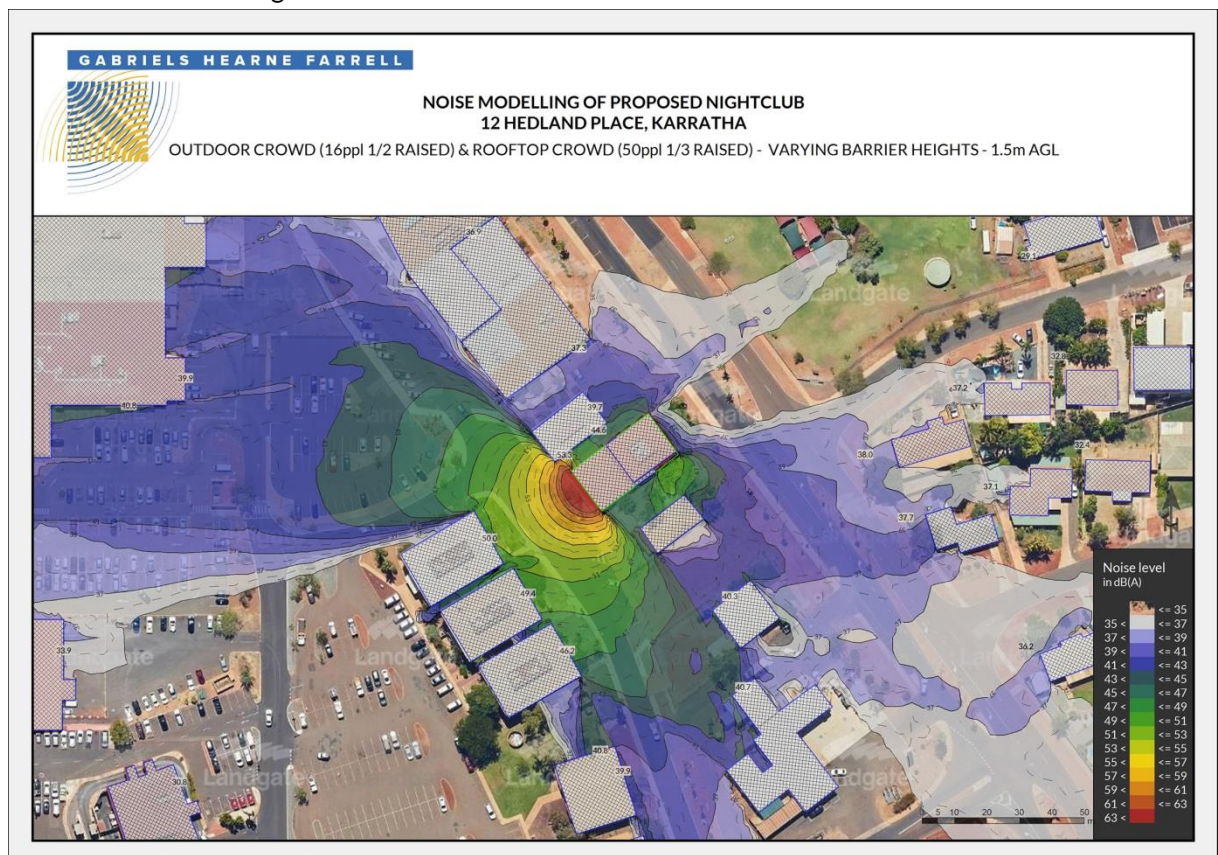


Image 03 - Noise Emissions from Outdoor Crowd Noise with Barriers

The noise modelling of this scenario is indicating that the predicted noise level at the closest residence is now 38 dB(A), achieving compliance at all times of the day. It must be noted that management of particularly noisy patrons will still be required in order to maintain this compliance.

For the rooftop bar area we have limited the numbers to 50 people in order to achieve compliance at all times. It should be noted that our calculations are indicating that there is no restriction on numbers prior to 10pm i.e. the results are indicating that 240 people on the roof top area would still achieve compliance at this 'evening' time period (43 dB(A) at the nearest neighbour).

It is assumed that the gap remaining around the smokers area is adequate for code ventilation purposes. It is also critical that the flooring of the rooftop bar area maintains the barrier performance. This can be achieved via fibre cement sheeting meeting the surrounding barriers. Open slatted decking by itself is unlikely to be adequate. Care must therefore be taken as to water runoff, with any openings not to be facing residences.

6. GENERAL NOISE MANAGEMENT STRATEGIES

In addition to the noise control previously outlined in this report, the following general noise management strategies should be implemented by the proponents.

- Glass shall only be emptied into the outside bins between the hours of 7am and 7pm (9am to 7pm on Sundays and Public Holidays).
- Management will maintain a log book for any complaints regarding noise and disturbance in the area. Any complaint received is entered into the book, with the date and time of the complaint, the staff member who received the complaint, and the action taken. The approved manager will then contact the complainant to ascertain whether the action taken is sufficient to answer the concern expressed.

7. CONCLUSION

This report summarises the project requirements in terms of compliance with the Environmental Protection (Noise) Regulations, 1997. This includes determination of the relevant site specific Assigned Noise Level criteria.

A description of each noise source and applicable noise level criteria has been provided, including acknowledgment of relevant adjustments required for noise sources with particular characteristics.

A preliminary acoustic assessment and construction has been provided based upon a review of the current architectural documented supplied. In short, these calculations indicate that:

Noise Breakout from Internal Music

- Compliance is achieved at all times on any day of the week, provided:
 - Internal noise levels are limited to 92 dB(A) downstairs
 - Internal noise levels are limited to 82 dB(A) upstairs
 - All entrances / exits are provided with dedicated acoustic lobbies.
 - Lobbies are to be acoustically absorbent and doors to have adequate acoustic seals.

Noise Emissions from Outdoor Crowd Noise

- Compliance is achieved at all times on any day of the week, provided:
 - A solid 2.1m high barrier to be provided to the North and South of the smokers area, with the East side barrier to meet the underside of the floor slab above.
 - A solid 2.1m high barrier around the Western half of the rooftop bar area, with the Eastern side to have a 2.8m high barrier.
 - The rooftop bar to be limited to 50 people after 10pm. No restrictions acoustically on capacity prior to this time.
 - Barrier to be constructed of minimum 9mm fibre cement sheeting, glass, perspex or similar with no gaps.
 - Flooring of rooftop bar to be solid with no gaps for sound to flank under.

Hopefully all of the information contained within this report is clear. However, if you have any queries regarding any of this then please feel free to contact the undersigned on 9474 5966.

Regards,

Michael Ferguson

Associate Director B.IntArch(Hons) M.A.A.S.



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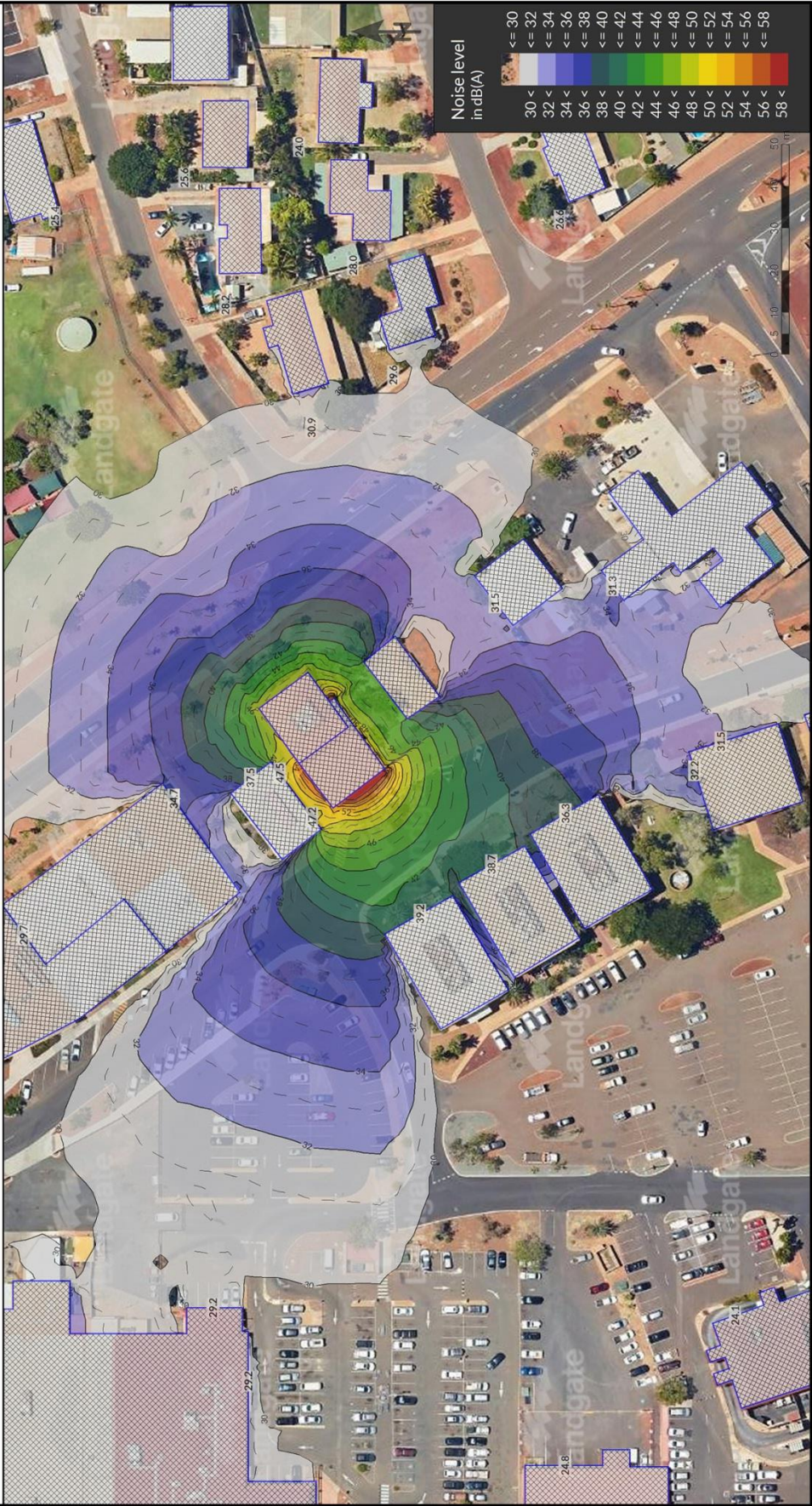
ATTACHMENTS

APPENDIX A - Noise Contour Diagrams (x3)

GABRIELS HEARNE FARRELL



NOISE MODELLING OF PROPOSED NIGHTCLUB
12 HEDLAND PLACE, KARRATHA
MUSIC BREAKOUT - AS CONSTRUCTED - 1.5m ABOVE GROUND LEVEL

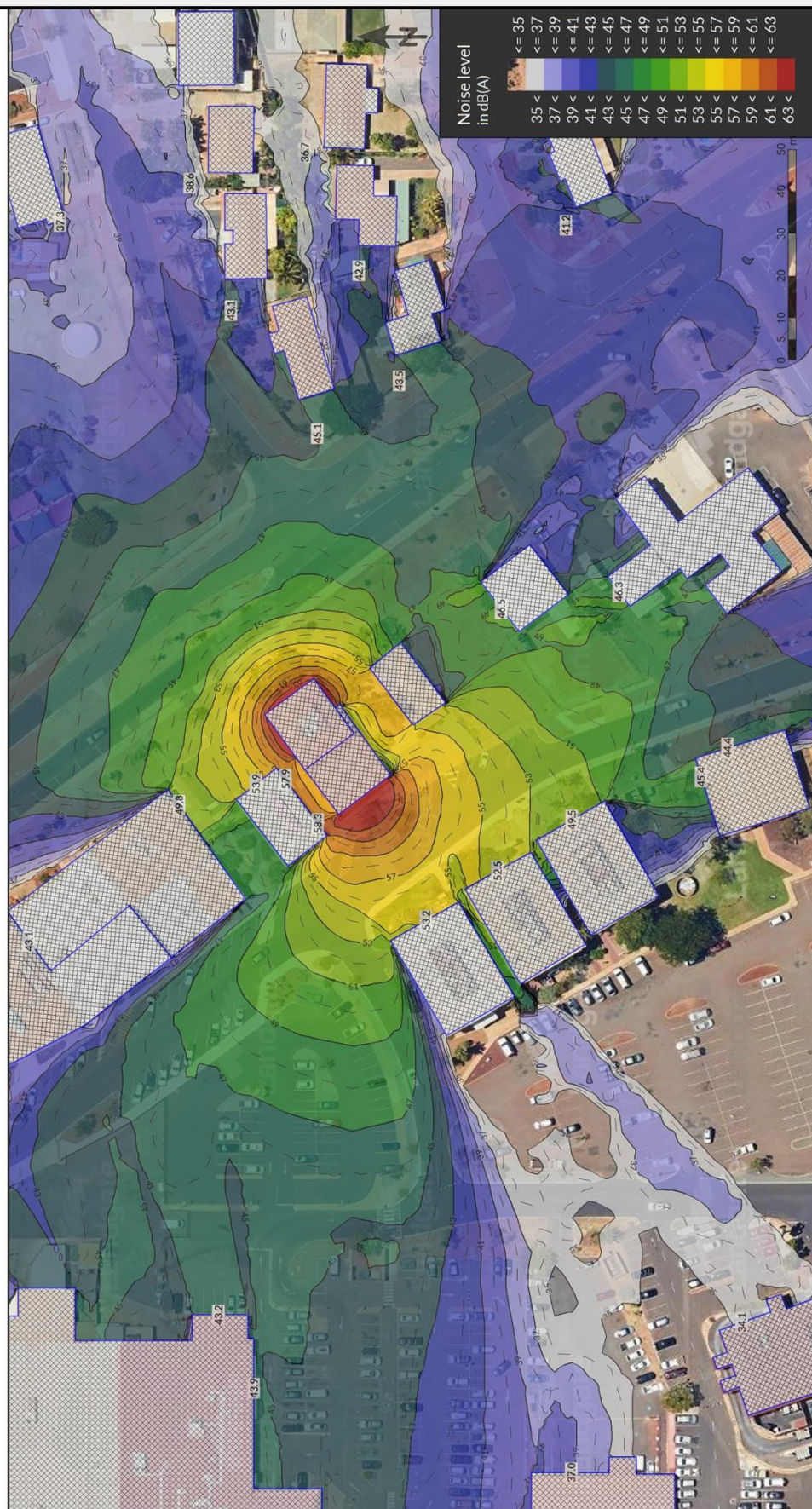


GABRIELS HEARNE FARRELL



NOISE MODELLING OF PROPOSED NIGHTCLUB 12 HEDLAND PLACE, KARRATHA

OUTDOOR CROWD (16ppl 1/2 RAISED) & ROOFTOP CROWD (50ppl 1/3 RAISED) - NO BARRIERS - 1.5m AGL



GABRIELS HEARNE FARRELL



NOISE MODELLING OF PROPOSED NIGHTCLUB
12 HEDLAND PLACE, KARRATHA

OUTDOOR CROWD (16pppl 1/2 RAISED) & ROOFTOP CROWD (50pppl 1/3 RAISED) - VARYING BARRIER HEIGHTS - 1.5m AGL

