APPENDIX J

Environmental Noise Assessment

GABRIELS HEARNE FARRELL

ENVIRONMENTAL NOISE DA REPORT

PROPOSED BREWERY
1248 KARNUP RD, SERPENTINE

17th February 2022

For

BRIGHT TANK BREWING CO.

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EAST PERTH WA 6004

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ATTACHMENTS

Report Version	Author	Comment	Date
0	Benjamin Farrell	-	17th February 2022

EXECUTIVE SUMMARY

Gabriels Hearne Farrell Pty Ltd have undertaken an environmental noise assessment for the proposed brewery at 1248 Karnup Rd, Serpentine. The assessment suggests that the proposed development is capable of complying with the Environmental Protection (Noise) Regulations 1997. Compliance is reliant on implementation on the following noise control strategies:

ARCHITECTURAL REQUIREMENTS

Glazing – External glazing to have a sound reduction of R_w 31 or greater (eg single 6.38 mm laminated glass). The current elevation drawings do not indicate the extent of openable windows, it has been assumed that a total of 5% of the external glazing on the north, east, and, and west façades is openable (eg operable louvres, sliding windows, or awning windows). We have assumed there will be large glass bi-fold doors on the south façade onto the Terrace Bar.

Roof construction –Colorbond sheeting with Anticon 80 insulation installed to the underside.

'Ceiling' within the hospitality venue – An acoustically absorbent 'ceiling' shall be provided within the hospitality venue. The selected acoustically absorbent ceiling shall be specified to achieve a Noise Reduction Coefficient (NRC) of 0.75 or greater. Examples include:

- Seamless perforated plasterboard within minimum 75 mm glasswool insulation over.
- Perforated timber ceiling (minimum 18% perforation factor) with minimum 75 mm glasswool insulation over.

External wall construction – The external walls shall achieve a minimum sound reduction of R_w 47. This is easily achieved with cavity masonry, brick-veneer, or concrete panel construction. This performance can be achieved with steel framed construction consisting of 9 mm fibre-cement cladding + top-hats + 92 mm studs with 90 mm glasswool batts + 13 mm plasterboard.

NOISE MANAGEMENT REQUIREMENTS

1) Entertainment in the form of acoustic dous and trios are acceptable within the hospitality space at any time, including when external windows and doors are open;
2) All external windows and doors shall be kept closed when loud amplified music greater than 83 dB(A) is performed within the venue. This includes DJ Entertainment and rock bands with percussion and bass guitar;
3) In the event that amplified entertainment occurs beyond 10 pm at night within the hospitality venue, it shall not exceed 90 dB(A) on the basis of windows and doors being closed;
4) Speakers within the external areas shall be specified/limited such that the music volume does not exceed 65 dB(A) at the outer edges of the first floor external terraces, and does not exceed 65 dB(A) at the eastern edge of the ground floor Outdoor Dining Area. The outdoor speakers shall eb switched off prior to 10 pm;
5) Waste Collection vehicles only permitted on site between 7 am and 7 pm, Monday to Saturday;
6) Glass shall only be emptied into the outside bins between the hours of 7 am and 7 pm (9 am to 7 pm on Sundays);
7) 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; and,
8) Security staff shall ensure all patrons leave the venue in a prompt and orderly fashion.

1. INTRODUCTION

Gabriels Hearne Farrell Pty Ltd was commissioned to undertake modelling of the potential environmental noise emissions from the proposed Brewery at 1248 Karnup Rd, Serpentine.

The purpose of the assessment was to ensure that the proposed development has the capability of complying with the Environmental Protection (Noise) Regulations 1997, at the Development Approval stage. The assessment considers noise emissions from patrons within the external and internal areas, amplified music associated with the venue, noise emissions from children playing in the playground, noise associated with food trucks, and noise from mechanical services.

2. PROJECT BACKGROUND

The proposed Brewery will be located towards the southern end of 1248 Karnup Rd. The site context is illustrated in Figure 1 below.

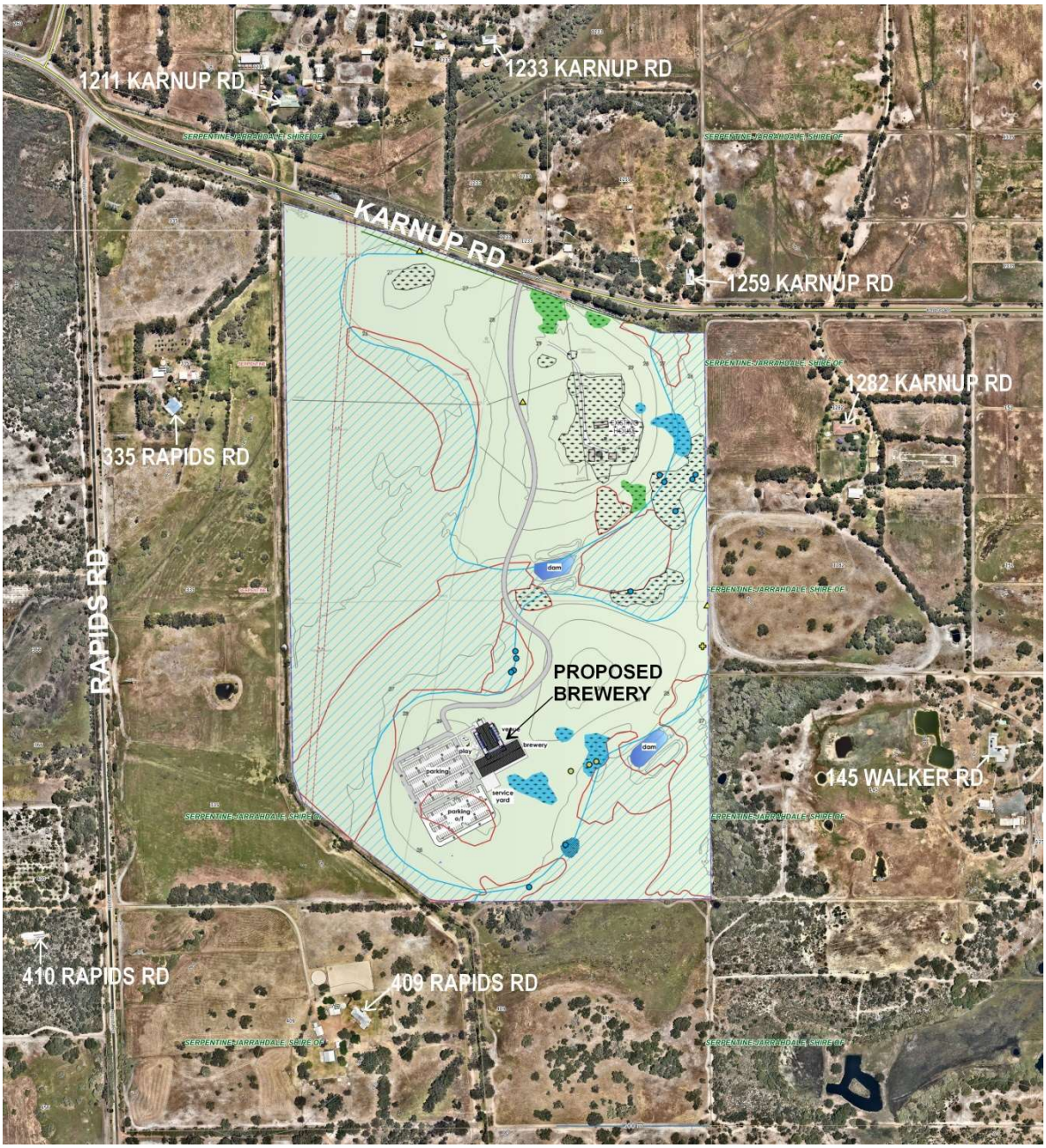

Figure 1 – Site context

There are existing residences located around the proposed Brewery, which are identified in Figure 1. The closest residence is a house located at 409 Rapids Rd, located approximately 350 metres from the Brewery building.

At this state the proponent is proposing to operate the hospitality venue Friday to Sunday, with the following operating hours:

- Friday – 11 am to 10 pm;
- Saturday – 7 am to 10 pm; and,
- Sunday – 7 am to 10 pm.

The proposed development will consist of a brewery building which will not generally be publicly accessible, and attached to the north side of the brewery building will be a large hospitality venue that may serve up to 1000 patrons. A children's playground is proposed on the western side of the hospitality venue. The hospitality venue will have interior dining spaces at ground level. There will be an outdoor dining area located on the ground floor level to the eastern side of the building, in addition to alfresco areas at first floor level along the eastern and western edges of the building. There will also be an outdoor bar area (Terrace Bar) located at first floor level between the brewery building and the hospitality building.

Please note that the brewery operations do not produce any noteworthy noise emissions, other than standard mechanical services (eg exhaust fans).

3. NOISE LEVEL CRITERIA

In Western Australia, noise transmission from one property to another is governed by the Environmental Protection (Noise) Regulations 1997. These regulations establish 'Assigned Levels' which are the noise levels that cannot be exceeded at surrounding premises.

3.1 'Assigned Levels' for the surrounding residences

The 'Assigned Levels' for the houses on surrounding lots are provided in Table 1. The 'Assigned Levels' are based on an *influencing factor* of 0 dB.

Type of premises receiving noise	Time of day	Assigned Level (dB)		
		L_{A10}	L_{A1}	$L_{A\,max}$
Noise Sensitive Premises: highly sensitive area (eg within 15 metres of a house)	7 am to 7 pm Monday to Saturday	**45**	55	65
	9 am to 7 pm Sunday and public holidays	**40**	50	65
	7 pm to 10 pm all days	**40**	50	55
	10 pm to 7 am Monday to Saturday and 10 pm to 9 am on Sundays and public holidays	**35**	45	55

Table 1– Assigned Levels for the surrounding houses

Please note that the noise levels that must not be exceeded beyond 15 metres from a house are outlined in Table 2 on the following page.

Type of premises receiving noise	Time of day	Assigned Level (dB)		
		L_{A10}	L_{A1}	$L_{A\,max}$
Noise sensitive premises: any area other than highly sensitive area	All hours	**60**	75	80

Table 2 – Assigned Levels to be achieved on adjacent lots, beyond 15 metres from a house

There is an existing house located on the same lot as the Brewery (1248 Karnup Rd). In accordance with Schedule 1 Part B of the Environmental Protection (Noise) Regulations 1997, this house would be deemed a Caretaker's residence on a commercial property. The 'Assigned Level' for this Caretaker's residence is as per Commercial premises, which are the same levels as those stated in Table 2.

3.2 Noise Character

Regulation 7(b) requires that the noise emission must be 'free' of annoying characteristics, namely tonality (eg whining, droning), modulation (like a siren), and impulsiveness (eg thumping). Where noise emissions do exhibit the above noise characteristics, an adjustment is made to the measured/calculated noise level (in accordance with Regulation 9):

- *Tonality* 5 dB is added to the measured/calculated level
- *Modulation* 5 dB is added to the measured/calculated level
- *Impulsiveness* 10 dB is added to the measured/calculated level
- *Amplified music* 10 dB is added to the measured/calculated level where impulsiveness is not present.

4. NOISE MODELLING PROCEDURE

The potential noise emissions from the proposed development has been modelled using the *SoundPLAN 8.2* 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.

Given that the '*highly sensitive area*' is a zone within 15 metres of a house, we have placed point receivers within the noise model at 15 metres away from the houses identified in Figure 1, in the direction of the brewery.

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 for the noise modelling is outlined below. These are considered the worst-case for noise propagation, and are taken from the document titled *EPA Guidance for the Assessment of Environmental Factors – No.8 Environmental Noise.*

	Day	**Night**
Temperature	20°C	15°C
Relative Humidity	50%	50%
Wind	4 m/s in all directions simultaneously	3 m/s in all directions simultaneously
Pasquil Stability Class	E	F

Table 3 – Meteorological conditions

At wind speeds greater than 4 m/s, the noise generated by moving foliage becomes the dominant ambient noise source.

4.2 Topography

The topography of the land was input into the noise model based on the 1 metre contour data available on the Shire of Serpentine Jarrahdale Intramaps.

4.3 Building envelope construction

In relation to the hospitality venue, the noise modelling has been based on the following building envelope construction:

Glazing – External glazing to have a sound reduction of R_w 31 or greater (eg single 6.38 mm laminated glass). The current elevation drawings do not indicate the extent of openable windows, it has been assumed that a total of 5% of the external glazing on the north, east, and, and west façades is openable (eg operable louvres, sliding windows, or awning windows). We have assumed there will be large glass bi-fold doors on the south façade onto the Terrace Bar.

Roof construction –Colorbond sheeting with Anticon 80 insulation installed to the underside.

'Ceiling' within the hospitality venue – An acoustically absorbent 'ceiling' shall be provided within the hospitality venue. The selected acoustically absorbent ceiling shall be specified to achieve a Noise Reduction Coefficient (NRC) of 0.75 or greater. Examples include:

- Seamless perforated plasterboard within minimum 75 mm glasswool insulation over.
- Perforated timber ceiling (minimum 18% perforation factor) with minimum 75 mm glasswool insulation over.

External wall construction – The external walls shall achieve a minimum sound reduction of R_w 47. This is easily achieved with cavity masonry, brick-veneer, or concrete panel construction. This performance can be achieved with steel framed construction consisting of 9 mm fibre-cement cladding + top-hats + 92 mm studs with 90 mm glasswool batts + 13 mm plasterboard.

5. MODELLING OF PATRON/CROWD NOISE

5.1 Scenario 1

Scenario 1 demonstrates the potential patron/crowd noise emissions, based on the following assumptions:

- Internal space of the hospitality venue fully occupied, with low level background music (the patron noise is the dominant internal noise source). This has been based on an internal sound level of 83 dB(A) inside the venue, which is based on measurements undertaken at similar venues. Please note that louder amplified music has been modelled in Scenario 2A and 2B;
- All of the external windows and doors of the hospitality venue are open;
- All alfresco areas and outdoor dining areas are occupied. The assessment has been based on one-third of outdoor patrons speaking simultaneously (SWL of 72 dB(A) per speaking person);
- 50 children playing in the playground. The noise level of children has been based on the AAAC Guideline titled '*AAAC Guideline for Child Care Centre Acoustic Assessment*' (ie Sound Power Level of 86 dB(A) per group of 10 children).

The spectrums utilised for the noise sources are provided in Table 4.

Frequency (Hz)	63	125	250	500	1k	2k	4k	**dB(A)**
Internal Sound Pressure Level within the hospitality venue	70	79	78	81	79	75	70	**83**
Ground floor Outdoor Dining Area (80 seats) Sound Power Level (SWL)	66	67	77	84	83	76	72	**86**
First floor – East outdoor terrace (108 patrons) SWL	67.6	68.6	78.6	85.6	84.6	77.6	73.6	**88**
First floor – West outdoor terrace (108 patrons) SWL	67.6	68.6	78.6	85.6	84.6	77.6	73.6	**88**
Terrace Bar (20 seats) SWL	61	82	72	79	78	71	67	**81**
50 children within playground SWL	64	74	89	92	89	79	69	**93**

Table 4 – Patron noise levels

The relevant 'Assigned Level' for Scenario 1 is L_{10} 40 dB(A) given that the brewery will not be open after 10 pm.

The results of the Scenario 1 noise modelling are presented on a noise contour plan in Appendix A. A summary of the results is provided below.

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{10} #	Relevant 'Assigned Level'	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{10} 25 dB(A)	L_{10} 25 dB(A)	L_{10} 40 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{10} 25 dB(A)	L_{10} 25 dB(A)	L_{10} 40 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{10} 28 dB(A)	L_{10} 28 dB(A)	L_{10} 40 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{10} 28 dB(A)	L_{10} 28 dB(A)	L_{10} 40 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{10} 26 dB(A)	L_{10} 26 dB(A)	L_{10} 40 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{10} 35 dB(A)	L_{10} 35 dB(A)	L_{10} 40 dB(A)	YES
410 Rapids Rd (within 15 metres of house)	L_{10} 29 dB(A)	L_{10} 29 dB(A)	L_{10} 40 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{10} 32 dB(A)	L_{10} 32 dB(A)	L_{10} 40 dB(A)	YES
Highest noise level at boundary	L_{10} 42 dB(A)	L_{10} 42 dB(A)	L_{10} 60 dB(A)	YES

Table 5 – Scenario 1 results

- Crowd noise is not known to contain any annoying characteristics as defined in the Environmental Protection (Noise) Regulations 1997, therefore no adjustment is required.

The calculated noise levels are compliant with the applicable 'Assigned Levels'. Furthermore, calculated noise levels are also compliant with the after 10 pm 'Assigned Levels' which indicates that it would be acceptable for the venue to operate after 10 pm in the future if the proponent wanted to stay open later.

6. MODELLING OF LOUD AMPLIFIED MUSIC WITHIN THE VENUE

As per most hospitality venues, it is likely that there will be live entertainment within the within the proposed venue. This may consist of DJ entertainment, or a live band of some form. Scenario 2A and 2B was undertaken to establish the maximum allowable noise level for this entertainment, whilst still complying with the Environmental Protection (Noise) Regulations 1997.

6.1 Scenario 2A – Amplified music within venue with external windows are doors closed

Scenario 2A was undertaken to determine the maximum permissible amplified music volume within the hospitality venue associated with live entertainment, when the external doors and windows are open. This was based on an amplified music volume of 85 dB(A) at the perimeter of the internal space (this is typical of DJ entertainment).

The results of Scenario 2A are presented as a noise contour plan in Appendix A, and a summary is provided in Table 6 on the following page.

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{10} #	Relevant 'Assigned Level' (before 10 pm)	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{10} 24 dB(A)	L_{10} 34 dB(A)	L_{10} 40 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{10} 27 dB(A)	L_{10} 37 dB(A)	L_{10} 40 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{10} 29 dB(A)	L_{10} 39 dB(A)	L_{10} 40 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{10} 29 dB(A)	L_{10} 39 dB(A)	L_{10} 40 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{10} 27 dB(A)	L_{10} 37 dB(A)	L_{10} 40 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{10} 32 dB(A)	L_{10} 42 dB(A)	L_{10} 40 dB(A)	NO, but will comply if music is limited to 83 dB(A)
410 Rapids Rd (within 15 metres of house)	L_{10} 27 dB(A)	L_{10} 37 dB(A)	L_{10} 40 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{10} 30 dB(A)	L_{10} 40 dB(A)	L_{10} 40 dB(A)	YES
Highest noise level at boundary	L_{10} 40 dB(A)	L_{10} 50 dB(A)	L_{10} 60 dB(A)	YES

Table 5 – Scenario 2A

Includes +10dB penalty due to the emissions being music, as per Regulation 9(3)(b).

The Scenario 2A results suggest that the amplified music shall be limited to 83 dB(A) within the venue when all of the external windows and doors are open. In our experience the noise level associated with acoustic dous and trios is typically below 83 dB(A), therefore it will be acceptable to have this form of entertainment when all of the external windows are doors are open. However, DJ entertainment and live bands with percussion and bass guitar are likely to exceed 83 dB(A), hence it will be necessary for the external windows and doors to be kept shut when this type of entertainment is occurring.

NOTE – In relation to having the external windows and doors shut as discussed above, it will be acceptable for the doors to open and close for short periods as people enter and exit the internal spaces. Although opening of doors will result in minor increase in noise break-out from the venue, the resultant noise levels will still comply with the L_1 'Assigned Levels'.

6.2 Scenario 2B – Live band within venue with the external windows are doors closed

Scenario 2B was undertaken to determine the maximum permissible amplified music volume within the hospitality venue associated with live entertainment, when the external doors and windows are closed. This was based on an amplified music volume of 95 dB(A) at the perimeter of the internal space, which is typical of a full rock band (eg percussion, bass guitar, and other amplified instruments).

The results of Scenario 2B are presented as a noise contour plan in Appendix A, and a summary is provided in Table 7 on the following page.

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{10} #	Relevant 'Assigned Level' (before 10 pm)	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{10} 20 dB(A)	L_{10} 30 dB(A)	L_{10} 40 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{10} 21 dB(A)	L_{10} 31 dB(A)	L_{10} 40 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{10} 24 dB(A)	L_{10} 34 dB(A)	L_{10} 40 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{10} 25 dB(A)	L_{10} 35 dB(A)	L_{10} 40 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{10} 24 dB(A)	L_{10} 34 dB(A)	L_{10} 40 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{10} 30 dB(A)	L_{10} 40 dB(A)	L_{10} 40 dB(A)	YES
410 Rapids Rd (within 15 metres of house)	L_{10} 24 dB(A)	L_{10} 34 dB(A)	L_{10} 40 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{10} 30 dB(A)	L_{10} 40 dB(A)	L_{10} 40 dB(A)	YES
Highest noise level at boundary	L_{10} 35 dB(A)	L_{10} 45 dB(A)	L_{10} 60 dB(A)	YES

Table 6 – Scenario 2B

Includes +10dB penalty due to the emissions being music, as per Regulation 9(3)(b).

The Scenario 2B results confirm that a live band within the venue can comply with the relevant 'Assigned Levels' provided that the external windows are doors are closed. However, it will be acceptable for the doors to open and close for short periods as people enter and exit the internal spaces. Although opening of doors will result in minor increase in noise break-out from the venue, the resultant noise levels will still comply with the L_1 'Assigned Levels'.

NOTE – Although not currently proposed by the proponent, it is possible in the future that the venue may be used for private events (eg weddings) which extend beyond 10 pm, or the proponent may wish to extend their liquor licence beyond 10 pm in the future. In these situations. Any live musical entertainment will need to be limited to 90 dB(A) inside the venue after 10 pm in order to comply with the 'Assigned Levels'. It may be necessary for the venue to install a noise limiter if these situations are to occur.

6.3 Scenario 2C – Speakers within the alfresco areas

Amplified speakers will likely be installed within the various alfresco/outdoor dining/terrace areas to provide background music. Scenario 2C was conducted to determine the maximum permissible volume for speakers within the external areas.

The modelling of outdoor speakers was based on the following configuration:

- A total of 15 speakers within the first floor outdoor areas, mounted to the façade of the building (6 located along west façade, 6 along the east façade, and three within the Terrace Bar area). The music volume set to achieve a level of 65 dB(A) at the balcony/terrace edge (ie 5.6 metres from the façade); and
- A total of 3 speakers mounted to the façade within the ground floor Outdoor Dining Area, set to achieve a level of 65 dB(A) at the eastern edge of this area.

The Scenario 2C results are provided in Appendix A, with a summary in Table 7 on the following page:

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{10} #	Relevant 'Assigned Level' (before 10 pm)	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{10} 19 dB(A)	L_{10} 29 dB(A)	L_{10} 40 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{10} 22 dB(A)	L_{10} 32 dB(A)	L_{10} 40 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{10} 24 dB(A)	L_{10} 34 dB(A)	L_{10} 40 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{10} 24 dB(A)	L_{10} 34 dB(A)	L_{10} 40 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{10} 25 dB(A)	L_{10} 35 dB(A)	L_{10} 40 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{10} 30 dB(A)	L_{10} 40 dB(A)	L_{10} 40 dB(A)	YES
410 Rapids Rd (within 15 metres of house)	L_{10} 22 dB(A)	L_{10} 32 dB(A)	L_{10} 40 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{10} 25 dB(A)	L_{10} 35 dB(A)	L_{10} 40 dB(A)	YES
Highest noise level at boundary	L_{10} 35 dB(A)	L_{10} 45 dB(A)	L_{10} 60 dB(A)	YES

Table 7 – Scenario 2C

Includes +10dB penalty due to the emissions being music, as per Regulation 9(3)(b).

The noise modelling indicates that speakers within the outdoor areas can comply with the relevant 'Assigned Levels' provided the volume does not exceed 65 dB(A) at the outer edges of the outdoor dining areas / terraces. The outdoor speakers shall be switched off prior to 10 pm.

7. MODELLING OF NOISE EMISSIONS FROM VEHICLES

7.1 Scenario 3A – Patron vehicles driving in carpark and access road

Scenario 3A was modelled to predict the potential noise emission from customer vehicles driving within the carpark and along the access road. The modelling was based on the following inputs:

- Each vehicle with a Sound Power Level of 78 dB(A) (car driving slowly).
- A 8 cars driving in the carpark and 4 driving along the access road simultaneously

The Scenario 3A results are provided in Table 8.

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{10} #	Relevant 'Assigned Level' (before 10 pm)	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{10} 18 dB(A)	L_{10} 23 dB(A)	L_{10} 40 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{10} 20 dB(A)	L_{10} 25 dB(A)	L_{10} 40 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{10} 23 dB(A)	L_{10} 28 dB(A)	L_{10} 40 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{10} 23 dB(A)	L_{10} 28 dB(A)	L_{10} 40 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{10} 18 dB(A)	L_{10} 23 dB(A)	L_{10} 40 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{10} 29 dB(A)	L_{10} 39 dB(A)	L_{10} 40 dB(A)	YES
410 Rapids Rd (within 15 metres of house)	L_{10} 20 dB(A)	L_{10} 25 dB(A)	L_{10} 40 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{10} 30 dB(A)	L_{10} 35 dB(A)	L_{10} 40 dB(A)	YES
Highest noise level at boundary	L_{10} 35 dB(A)	L_{10} 40 dB(A)	L_{10} 60 dB(A)	YES

Table 8 – Scenario 3A

Includes + 5 dB penalty for 'tonality'

The adjusted noise level at the surrounding residences is compliant with the 'Assigned Levels', including at night between 10 pm and 7 am when the 'Assigned Level' is 35 dB(A).

7.2 Scenario 3B – Car doors closing within carpark

Given the short/sharp duration of car doors closing, this noise emissions is assessed against the L_{max} 'Assigned Level' of 55 dB(A). The assessment was based on 8 car doors closing simultaneously, each with a Sound Power level of 87 dB(A).

The results of Scenario 3B are provided in Appendix A and summarised below:

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{max} #	Relevant 'Assigned Level'	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{max} 22 dB(A)	L_{max} 32 dB(A)	L_{max} 55 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{max} 23 dB(A)	L_{max} 33 dB(A)	L_{max} 55 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{max} 22 dB(A)	L_{max} 32 dB(A)	L_{max} 55 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{max} 23 dB(A)	L_{max} 33 dB(A)	L_{max} 55 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{max} 25 dB(A)	L_{max} 35 dB(A)	L_{max} 55 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{max} 37 dB(A)	L_{max} 47 dB(A)	L_{max} 55 dB(A)	YES
410 Rapids Rd (within 15 metres of house)	L_{max} 28 dB(A)	L_{max} 38 dB(A)	L_{max} 55 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{max} 30 dB(A)	L_{max} 40 dB(A)	L_{max} 55 dB(A)	YES
Highest noise level at boundary	L_{max} 43 dB(A)	L_{max} 53 dB(A)	L_{max} 80 dB(A)	YES

Table 9 – Scenario 3B

Includes +10 dB for impulsiveness.

The Scenario 3B results are compliance with the L_{max} 'Assigned Levels' for all time periods.

7.3 Waste collection vehicles

Regulation 14A of the Environmental Protection (Noise) Regulations 1997 addresses the noise emissions associated with waste collection. Fundamentally, waste collection activities are exempt from complying with the 'Assigned Levels', provided the collection only occurs between the hours of 7 am and 7 pm Monday to Saturday, and between 9 am and 7 pm on Sundays and Public Holidays. This is reliant on the waste collection activities being undertaken in the quietest possible manner.

We understand that at this stage there is no proposal for out-of-hours waste collection.

8. MODELLING OF NOISE EMISSIONS FROM FOOD TRUCKS

The proponent has advised that whilst not confirmed now, it may be possible in the future that they will have a breakfast offering via food trucks. The food trucks will be located near the north-eastern corner of the hospitality building. Given that the breakfast offering would occur prior to 9 am on Sundays, the applicable 'Assigned Level' is L_{10} 35 dB(A).

The assessment of food truck noise emissions has been based on the following Sound Power Levels:

Frequency (Hz)	63	125	250	500	1k	2k	4k	dB(A)
Food truck (dominated by generator noise), Sound Power Level (SWL per truck	95	92	91	83	80	79	72	**87**
200 patrons (1/3 speaking at same time) Sound Power Level (SWL)	70	71	81	88	87	80	76	**90**
50 children within playground - SWL	64	74	89	92	89	79	69	**93**

Table 10 – Food truck Sound Power Levels

The results of the noise modelling are provided in Appendix A, and summarised below:

Noise receiver location (highest noise level)	Predicted noise level L_{10}	Adjusted noise level L_{10} #	Relevant 'Assigned Level' (before 9 am on Sundays)	Compliance
1211 Karnup Rd (within 15 metres of house)	L_{10} 25 dB(A)	L_{10} 25 dB(A)	L_{10} 35 dB(A)	YES
1233 Karnup Rd (within 15 metres of hours)	L_{10} 25 dB(A)	L_{10} 25 dB(A)	L_{10} 35 dB(A)	YES
1259 Karnup Rd (within 15 metres of house)	L_{10} 26 dB(A)	L_{10} 26 dB(A)	L_{10} 35 dB(A)	YES
1282 Karnup Rd (within 15 metres of house)	L_{10} 26 dB(A)	L_{10} 26 dB(A)	L_{10} 35 dB(A)	YES
145 Walker Rd (within 15 metres of house)	L_{10} 26 dB(A)	L_{10} 26 dB(A)	L_{10} 35 dB(A)	YES
409 Rapids Rd (within 15 metres of house)	L_{10} 35 dB(A)	L_{10} 35 dB(A)	L_{10} 35 dB(A)	YES
410 Rapids Rd (within 15 metres of house)	L_{10} 28 dB(A)	L_{10} 28 dB(A)	L_{10} 35 dB(A)	YES
335 Rapids Rd (within 15 metres of house)	L_{10} 31 dB(A)	L_{10} 31 dB(A)	L_{10} 35 dB(A)	YES
Highest noise level at boundary	L_{10} 40 dB(A)	L_{10} 40 dB(A)	L_{10} 60 dB(A)	YES

Table 11 – Scenario 4

- Crowd noise is not known to contain any annoying characteristics as defined in the Environmental Protection (Noise) Regulations 1997. Although the Food Trucks generators may contain tonal characteristics, the noise emissions from these will be inaudible above the patron/crowd noise which is the dominant noise source.

The predicted noise levels are compliant with the 'Assigned Levels' for all time periods, including before 7 am Monday to Saturday and before 9 am on Sundays.

9. MECHANICAL PLANT

At this early stage of the project it is not possible to assess the noise emissions from the mechanical plant given that there is currently no mechanical design or equipment selections. However, compliance will be achieved with the relevant 'Assigned Levels' by implementing common place noise control strategies, including:

- Selection of the quietest condensing units and evaporative coolers, incorporating variable speed drives;
- Selection of quiet refrigeration units which incorporate variable speed drives to achieve lower night noise emissions;
- Selection of quiet Kitchen Exhaust Fans, or potentially selection of in-line fans with discharge attenuators if necessary;
- Positioning of mechanical plant in locations where line-of-sight between the equipment and the residences is obstructed, or provision of acoustic screening where necessary.

The proposed mechanical plant will be assessed prior to the lodgement for the Building Permit, in order to ensure that the selected equipment is compliant with the Environmental Protection (Noise) Regulations 1997.

NOTE – We have been advised that the brewing activities themselves do not result in any noise emissions of significance. There will be ventilation fans installed for the brewery operations, and these will be specified to comply with the 'Assigned Levels' along with all of the other mechanical plant.

10. GENERAL NOISE MANAGEMENT PRACTICES

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

- Glass shall only be emptied into the outside bins between the hours of 7 am and 7 pm (9 am to 7 pm on Sundays).
- 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.
- Security staff shall ensure all patrons leave the venue in a prompt and orderly fashion.
- Deliveries shall only occur between the hours of 7 am and 7 pm Monday to Saturday, and between 9 am and 7 pm on Sundays and Public Holidays.

11. CONCLUSION

The potential noise emissions from the proposed brewery at 1248 Karnup Rd Serpentine, has been assessed. The noise modelling indicates that the proposed development has the capability of complying with the Environmental Protection (Noise) Regulations 1997.

Compliance with the aforementioned regulations is reliant on a combination of adequate building envelope construction and also noise management practices. These requirements have been established within this report for the purpose of the Development Application.

A revised acoustic report will be necessary at the Building Permit stage which includes an assessment of the selected mechanical plant, and also takes into account any design changes that may influence the environmental noise emissions.

Regards,

Benjamin Farrell
Director M.A.A.S.

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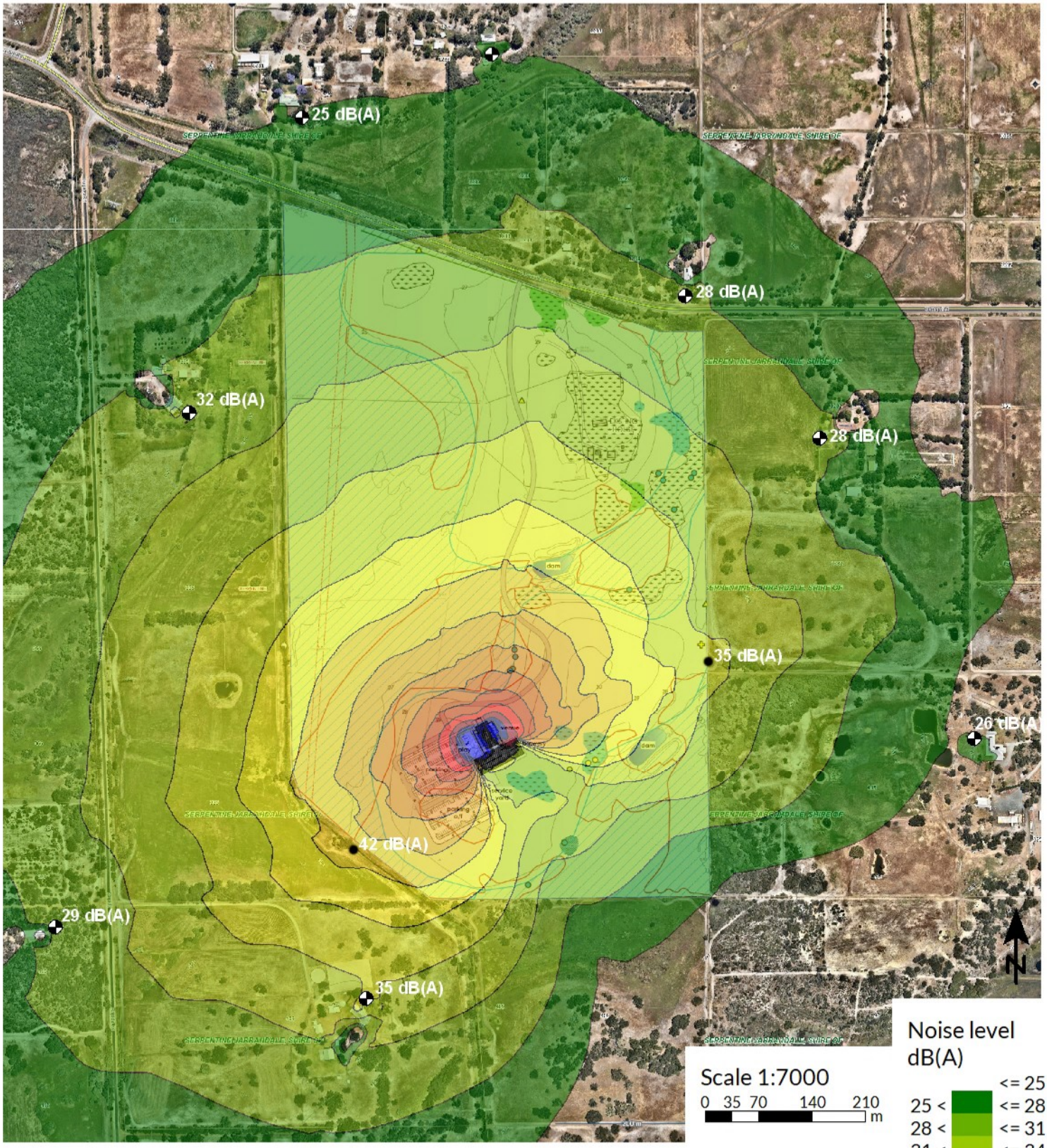
ATTACHMENTS

- APPENDIX A - Noise Contour Plans

ENVIRONMENTAL NOISE ASSESSMENT
BRIGHT TANK BREWING Co. - 1248 KARNUP RD, SEPTENTINE



Noise level dB(A)

	<= 25
25 <	<= 28
28 <	<= 31
31 <	<= 34
34 <	<= 37
37 <	<= 40
40 <	<= 43
43 <	<= 46
46 <	<= 49
49 <	<= 52
52 <	<= 55
55 <	<= 58
58 <	<= 61
61 <	<= 64
64 <	<= 67

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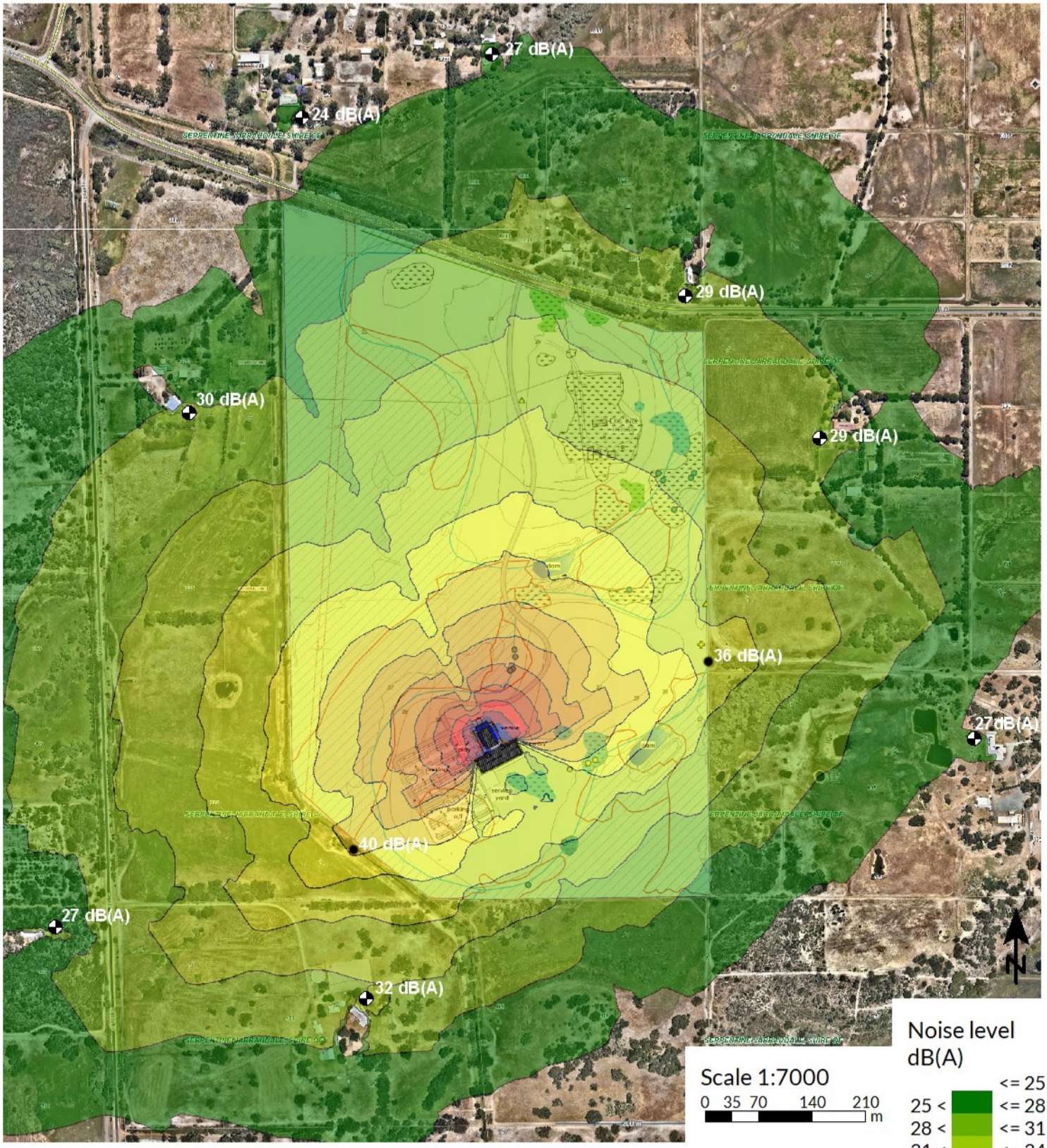
SCENARIO 1 - PATRON NOISE EMISSIONS WITH LOW LEVEL BACKGROUND MUSIC

- ALFRESCO AREAS FULLY OCCUPIED.
- PLAYGROUND IN USE.
- INTERNAL SPACES FULLY OCCUPIED, WITH LOW LEVEL BACKGROUND MUSIC PLAYING INSIDE VENUE..
- ALL EXTERNAL DOORS OPEN, ALL EXTERNAL WINDOWS OPEN (ASSESSMENT ASSUMES THAT 5% OF THE GLAZED FACADES CONSIST OF OPENABLE WINDOWS/LOUVRES.

ENVIRONMENTAL NOISE ASSESSMENT
BRIGHT TANK BREWING Co. - 1248 KARNUP RD, SEPTENTINE



Noise level dB(A)

	<= 25
25 <	<= 28
28 <	<= 31
31 <	<= 34
34 <	<= 37
37 <	<= 40
40 <	<= 43
43 <	<= 46
46 <	<= 49
49 <	<= 52
52 <	<= 55
55 <	<= 58
58 <	<= 61
61 <	<= 64
64 <	<= 67

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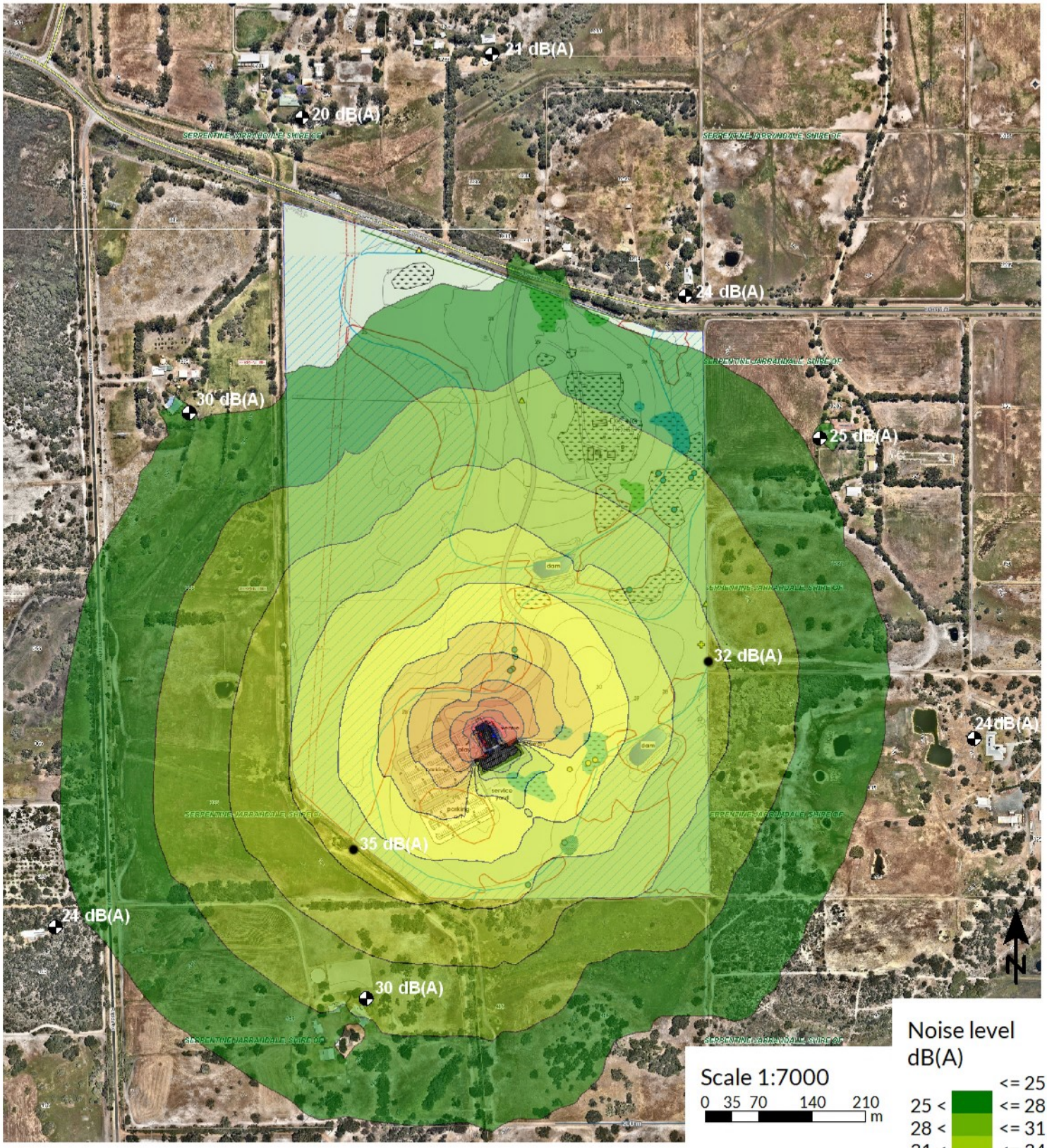
SCENARIO 2A - AMPLIFIED MUSIC WITHIN VENUE (eg DJ ENTERTAINMENT) WITH WINDOWS OPEN

- AMPLIFIED MUSIC AT 85 dB(A) WITHIN THE VENUE (AT THE PERIMETER GLAZING)
- ALL EXTERNAL DOORS OPEN, ALL EXTERNAL WINDOWS OPEN (ASSESSMENT ASSUMES THAT 5% OF THE GLAZED FACADES CONSIST OF OPENABLE WINDOWS/LOUVRES).

ENVIRONMENTAL NOISE ASSESSMENT
BRIGHT TANK BREWING Co. - 1248 KARNUP RD, SEPTENTINE



Noise level dB(A)

	<= 25
25 <	<= 28
28 <	<= 31
31 <	<= 34
34 <	<= 37
37 <	<= 40
40 <	<= 43
43 <	<= 46
46 <	<= 49
49 <	<= 52
52 <	<= 55
55 <	<= 58
58 <	<= 61
61 <	<= 64
64 <	<= 67

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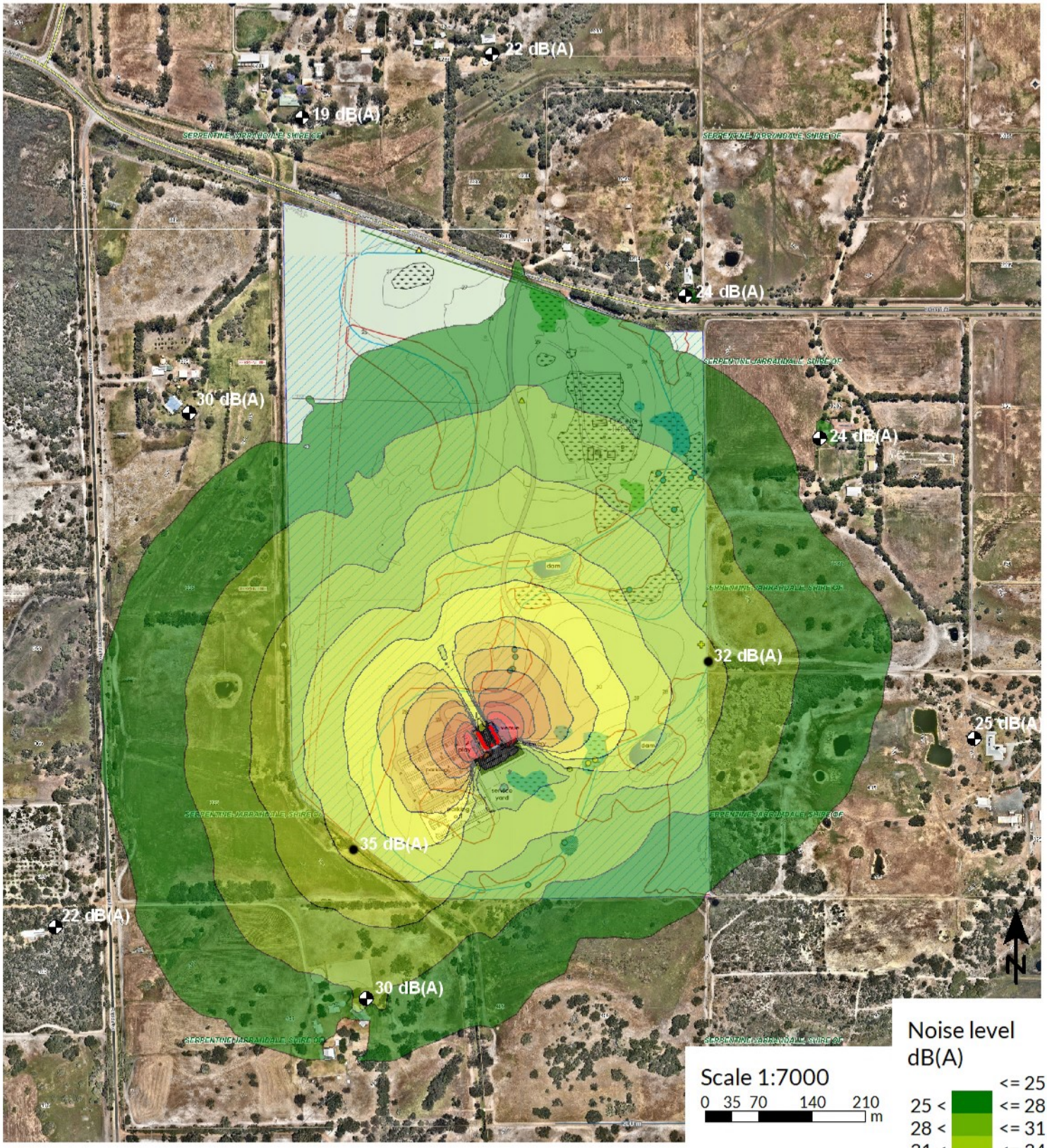
SCENARIO 2B - LIVE BAND WITHIN VENUE (95 dB(A)) WITH EXTERNAL DOORS AND WINDOWS CLOSED

- MUSICAL ENTERTAINMENT AT 95 dB(A) WITHIN THE VENUE (AT THE PERIMETER GLAZING)
- ALL EXTERNAL DOORS OPEN, ALL EXTERNAL WINDOWS CLOSED.

ENVIRONMENTAL NOISE ASSESSMENT
BRIGHT TANK BREWING Co. - 1248 KARNUP RD, SEPTENTINE



SCENARIO 2C - SPEAKERS IN ALFRESCO AREAS

- 6 SPEAKERS MOUNTED ON FIRST FLOOR WEST FACADE, RESULTING IN A NOISE LEVEL OF 65 dB(A) AT THE BALCONY EDGE AT FIRST FLOOR LEVEL.
- 6 SPEAKERS MOUNTED ON THE FIRST FLOOR EAST FACADE, RESULTING IN A NOISE LEVEL OF 65 dB(A) AT THE BALCONY EDGE AT FIRST FLOOR LEVEL.
- 3 SPEAKERS MOUNTED ON THE SOUTH FACED (WITHIN THE TERRACE BAR AREA)
- 3 SPEAKERS WITHIN THE GROUND FLOOR OUTDOOR COVERED DINING AREA (MOUNTED ON THE WALL)

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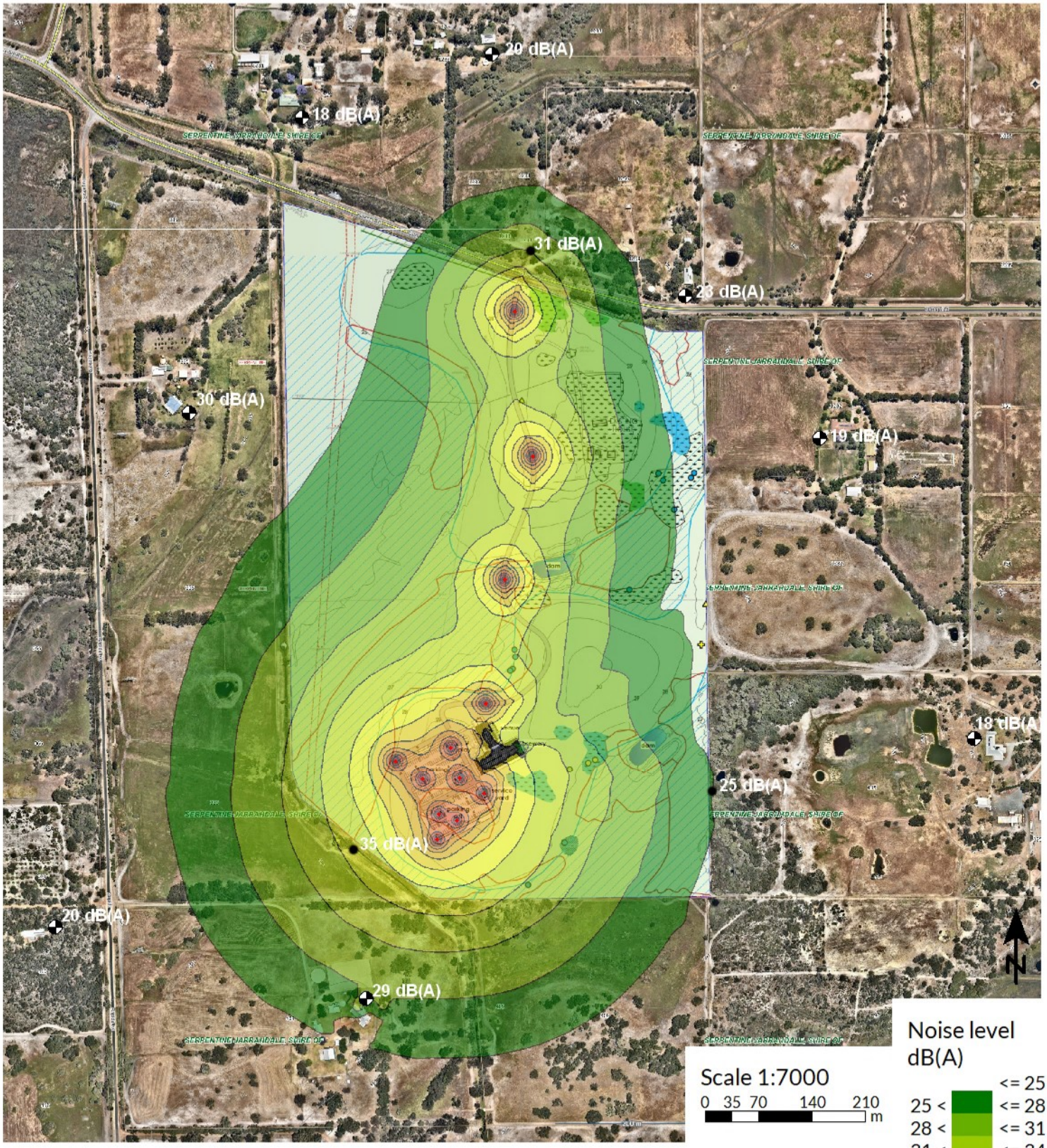
ENVIRONMENTAL NOISE ASSESSMENT
BRIGHT TANK BREWING Co. - 1248 KARNUP RD, SEPTENTINE



Noise level dB(A)

	<= 25
25 <	<= 28
28 <	<= 31
31 <	<= 34
34 <	<= 37
37 <	<= 40
40 <	<= 43
43 <	<= 46
46 <	<= 49
49 <	<= 52
52 <	<= 55
55 <	<= 58
58 <	<= 61
61 <	<= 64
64 <	<= 67

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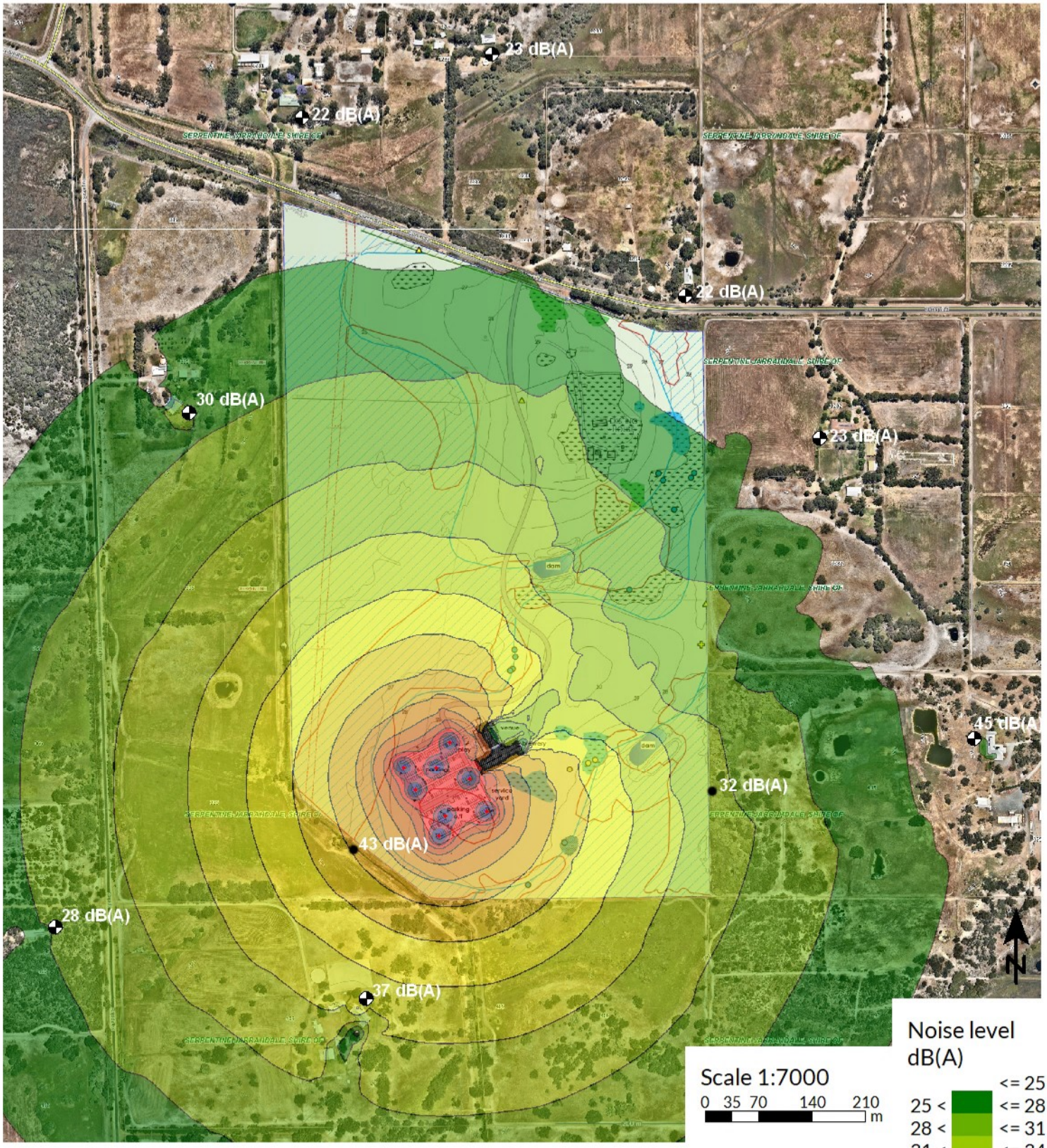
SCENARIO 3A - VEHICLES DRIVING ON ACCESS ROAD AND CARPARK

- FOUR CARS DRIVING ALONG ACCESS ROAD.
- EIGHT CARS DRIVING WITHIN CARPARK.

ENVIRONMENTAL NOISE ASSESSMENT
BRIGHT TANK BREWING Co. - 1248 KARNUP RD, SEPTENTINE



SCENARIO 3B - CAR DOORS CLOSING WITHIN CARPARK

- EIGHT CAR DOORS CLOSING SIMULTEANOUSLY.

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