

**July, 2023**

Table of Contents

---

REVISIONS AND CHANGES .....	2
EXECUTIVE SUMMARY .....	3
1 INTRODUCTION .....	4
2 DESCRIPTION OF SITE & LOCAL AREA .....	6
3 METHODOLOGY .....	8
4 NOISE MEASUREMENTS .....	10
5 OBSERVATIONS .....	13
6 RESULTS .....	14
7 NOISE MODELLING .....	17
8 RECOMMENDATIONS .....	20
9 DISCUSSION AND CONCLUSION .....	20
APPENDIX I - Zoning Map	
APPENDIX II - Noise Logger Data	
APPENDIX III - Noise Contour Maps	
APPENDIX IV - Glossary of Terms	

**ADVERTISED  
PLAN**

**Client:** Kongwak Butter Factory Co. Pty Ltd

**Job No:** N18175

**Report By:** Boaz Leong, Acoustic Consultant

**Reviewed By:** Guy Baxendale, Senior Acoustic Consultant

**This copied document to be made available  
for the sole purpose of enabling  
its consideration and review as  
part of a planning process under the  
Planning and Environment Act 1987.  
The document must not be used for any  
purpose which may breach any  
copyright**

**ENVIRONMENTAL NOISE ASSESSMENT  
KONGWAK**



**REVISIONS AND CHANGES**

DATE	REVISION	DESCRIPTION	CONSULTANT
February 2023	Draft.1	Initial draft	BL
July 2023	R2	Initial issue	BL

## **EXECUTIVE SUMMARY**

Kongwak Butter Factory Co. Pty Ltd engaged JTA Health, Safety & Noise Specialists to conduct an Environmental Noise Assessment for compliance with Victoria EPA Publication 1826.4 - *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) dated 20<sup>th</sup> May 2021.

An assessment has been conducted with respect to site noise emissions from the proposed development. Based on the assessment, control measures have been recommended to control noise emissions from the site to meet the Noise Protocol criteria.

Measures to control noise emissions have been identified to comply with the Noise Protocol Criteria and are summarised below:-

<b>Table ES1: List of Noise Control Measures</b>	
Acoustic Barrier	Install 2.4m high wall at boundary to adjacent residential sub-division with panelling of at least 10kg/m <sup>2</sup> . Wall to be continuous with no gaps. Doors to be shut when not in use.
External Mechanical Plant	Locate on roof or at ground level in acoustic enclosures as required to meet the design noise levels detailed in this report.
Waste Disposal	External waste operations to be conducted only during day time when the noise limits are less stringent.
Speaker System	Install a Noise Limiter which will be a digital limiter that measures, displays, and controls the sound pressure level in the space. It is expected to be installed within the audio chain that powers the venue speaker systems.
Cheese Factory Dining	Windows installed in acoustic frames with a minimum single 6 mm thick float glazing.
Volume Attenuation Area	Maintain existing foliage/trees between the Butter and Cheese Factory Commercial Premises and the Accommodation as well as along Brownes Road

## **1 INTRODUCTION**

---

Kongwak Butter Factory Co. Pty Ltd engaged JTA Health, Safety & Noise Specialists to conduct an Environmental Noise Assessment for the proposed redevelopment of the former Kongwak Butter and Cheese Factory at 1486-1488 Korumburra Wonthaggi Road, Kongwak (the subject site) in accordance with the Victoria EPA Publication 1826.4 - *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) dated 20<sup>th</sup> May 2021.

JTA conducted a survey of existing background noise levels between the 16<sup>th</sup> and 21<sup>st</sup> of December 2022.

The assessment includes:

- Measure existing background noise levels at close proximity to the subject site.
- Identify all major noise sources at the proposed development.
- Using the above information and data, develop a noise model to determine noise emissions.
- Provide recommendations in principle for all noise sources identified as requiring acoustic treatment.

The Noise Assessment consists of three distinct stages; the stages and related scope of works are as follows:

### **STAGE 1 – NOISE ASSESSMENT & MONITORING:**

The Environmental Noise Assessment was performed in accordance with the requirements of the EPA Victoria Publication 1826.4 - *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) dated 20<sup>th</sup> May 2021/

The Environmental Noise Assessment stage included:

- Attended and unattended measurements at suitable locations for environmental noise monitoring to measure existing background noise levels.
- Determine the applicable Noise Protocol recommended noise levels for each Noise Sensitive Receiver (NSR).

### **STAGE 2 - NOISE MODELLING:**

The Noise Modelling stage included:

- Using SoundPLAN noise modelling software to develop a computer noise model of the local areas including:
  - Topographic data pertinent to the local area
  - Location, elevation and directionality of major noise sources associated with the facility operations
  - Location and elevation of noise sensitive receivers
  - Location and elevation of miscellaneous buildings and structures in the propagation path between the source and the receiver
- Use the noise model to determine noise emissions from the proposed facility at relevant noise sensitive receivers.

**STAGE 3 - NOISE CONTROL DESIGN STAGE:**

- Using the results obtained from the noise model and the environmental noise measurements, determine noise control treatments in principle to efficiently control noise emissions from the subject site.

**Statement of Limitations**

JTA Health, Safety & Noise Specialists (JTA) have prepared this report for the exclusive use of the named client (the Client). Any opinions, conclusions or recommendations as are reasonably held or made by JTA as contained within this report apply only at the time of writing.

JTA shall make every reasonable effort to obtain a cost-effective result for the Client as outlined in the applicable scope of works and as agreed between JTA and the Client. While they have made every effort to provide an accurate and reliable report, JTA do not warrant the accuracy, reliability or completeness of this or any other report prepared by them and disclaim all responsibility for any loss or damage which may be suffered by any person or entity whether directly or indirectly from the client's reliance upon or use of this or any other report prepared by JTA.

This report must be read, reproduced and distributed in full. JTA cannot be held liable for any reliance the Client may put upon any reference to its contents or part thereof, which has been taken out of context nor can JTA be held liable for the Client's failure to accurately refer to the report in its entirety and as reproduced in full.

Assessment of environmental noise is subject to the noise sources being operational and safe to access and carry out the necessary testing as well as production, operating and environmental conditions. The identification, location, access to and assessment of noise sources relies on information provided directly or indirectly by the Client. Therefore JTA cannot and does not in any way whatsoever guarantee that any report includes the identification or assessment of any or all noise sources or their acoustic properties; or the identification or assessment of any or all noise sources that may have been safely accessible and visible to our consultants at the time they were on site.

The report findings and recommendations are reliable in respect of the proprietary software, equipment and methodologies and the professional judgement on which they are based. While JTA will make every reasonable effort to ensure their report is compliant in this regard and to argue its findings on behalf of the Client if required, JTA does not guarantee the report assessments, findings or recommendations will be accepted by any authority, entity or person.

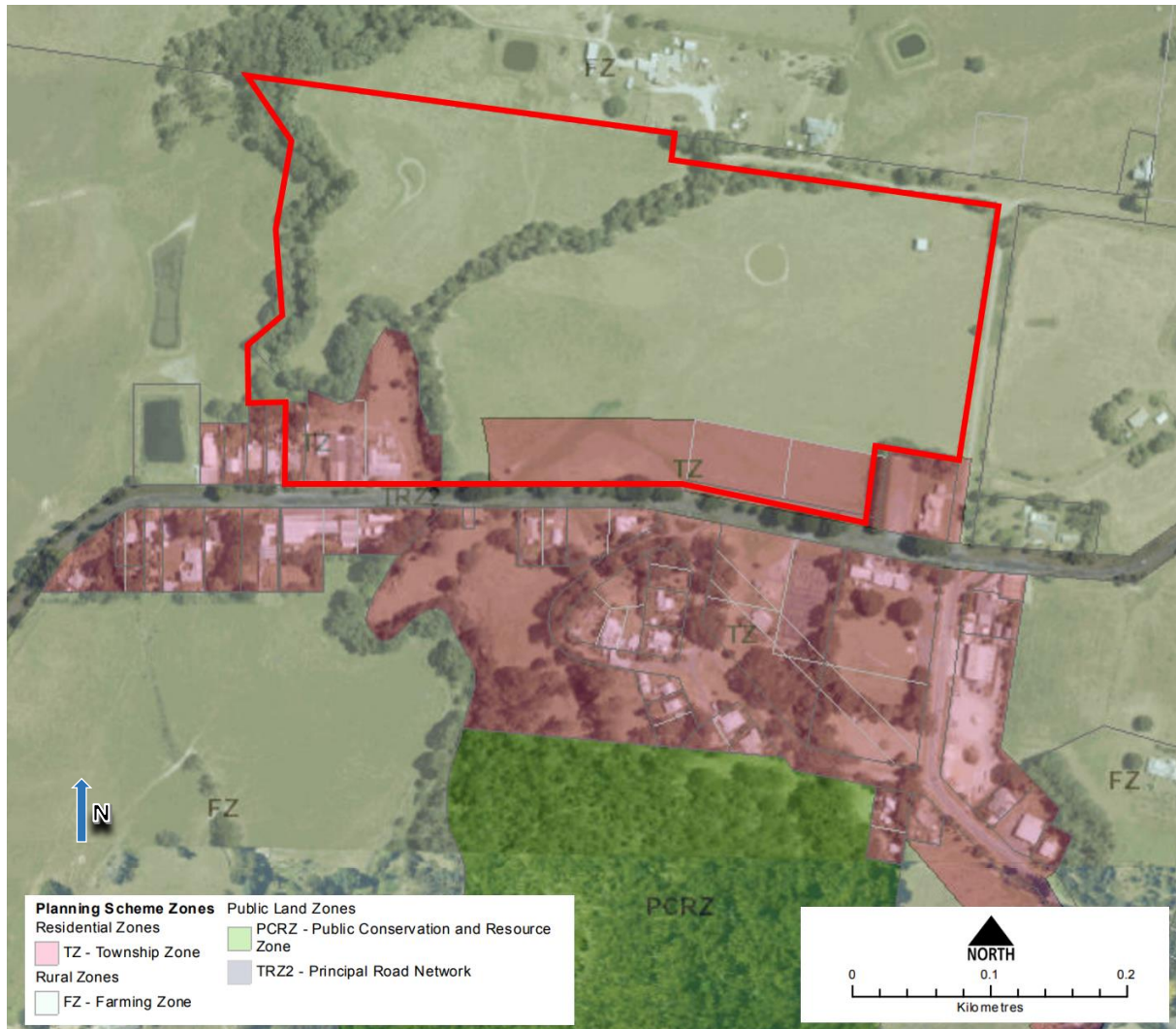
**Reliance on Information Provided by Others**

Where information has been provided by other parties, JTA does not guarantee the accuracy or completeness of this information. The Client therefore waives any claim against JTA and agrees to indemnify JTA for any loss, claim or liability arising from inaccuracies or omissions in information provided to JTA by third parties.

## 2 DESCRIPTION OF SITE & LOCAL AREA

Kongwak is a small town in Gippsland, Victoria, Australia. It is located on the Korumburra to Wonthaggi Road southeast of Melbourne, in the South Gippsland Shire. Kongwak had a population of 207 as at the 2021 Census.

The subject site is located to the north of the main road through the town centre. Figure 2.1 below provides an aerial site map showing the location of the subject site with respect to the locality.



**Figure 2.1: Aerial Site Map of Subject Site and Locality**

The proposed redevelopment includes a destination restaurant, accommodation, function centre and retail outlet.

Figure 2.2 on the following page provides a site plan of the proposed facility.



**Legend**

1. Butter and Cheese Factory commercial buildings (restaurant, providore, gallery, multi format event spaces)
2. Primary carpark (day-to-day)
3. Private pedestrian bridge
4. Accommodation
5. Ornamental lake / wetland
6. Privately owned land made available for public parkland (2 acres)
7. Overflow carpark (events)
8. Potting / storage shed
9. Vineyard
10. Market garden
11. Recycled water storage
12. Water storage tanks and wastewater treatment plant
13. Agricultural paddocks
14. Orchid
15. Rehabilitated billabong
16. Regenerated flora / fauna corridors (8 acres replanted with native and indigenous plants)

**Figure 2.2: Site Map of Proposed facility**

## **2.1 Site Location and Land Planning Zoning**

The land in the subject site is covered by both Township (TZ) and Farming (FZ) Zones in the South Gippsland planning scheme. (Refer to Appendix I for Zoning Map).

### 3 METHODOLOGY

#### 3.1 References

The assessment methodology has been developed with reference to the following legislation, standards and guidelines:-

- EPA Victoria Publication 1826.4 - Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Noise Protocol)

Noise emissions from plant operations are considered in the assessment.

#### 3.2 Noise Protocol

The Government of Victoria sets out its policies to control and reduce environmental pollution through the EPA Victoria Publication 1826 - *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) incorporated into the Environment Protection Regulations 2021 (the Regulations). The goal of Noise Protocol is to protect people from commercial, industrial and trade noise; or noise from entertainment venues that may affect the beneficial uses made of noise sensitive areas, which include normal domestic and recreational activities, including in particular, sleep in the night time period.

The protocol provides the means of determining noise limits for new and existing commercial, industrial and trade premises and entertainment venues as defined by the Regulations. It sets the methodology for assessing the effective noise level to determine unreasonable noise and compliance with the regulations.

Part I of the protocol outlines the methodology for setting noise limits for commercial, industrial and trade premises in both urban and rural areas of Victoria. Part II outlines the noise limits for indoor and outdoor entertainment venues and outdoor entertainment events. Both parts describe the steps that must be followed to undertake an assessment of the effective noise level within a noise sensitive area. A comparison between the effective noise level and the relevant noise limit determines whether the noise that is emitted is unreasonable under the regulations.

The Background Noise Levels and Noise Level from a facility are measured at a point within a "Noise Sensitive Area", usually the nearest residence or a site of complaint. The noise level is adjusted where necessary for factors that increase the annoyance of the noise such as tone, intermittency, and impulsive components. The final level is the Effective Noise Level, and is compared with the Noise Limit to determine compliance.

The Noise Protocol uses the time periods detailed below.

<b>Table 3.1 –Noise Protocols Part I Time Periods</b>			
<b>Period</b>	<b>Parameters</b>		
	<b>Monday to Friday</b>	<b>Saturday</b>	<b>Sunday</b>
<b>Day:</b>	0700 – 1800	0700 - 1300	-
<b>Evening:</b>	1800 – 2200	1300 - 2200	0700 - 2200
<b>Night:</b>	2200 - 0700	2200 - 0700	2200 - 0700

The Noise Protocol provides the methods and procedures for setting recommended noise levels for commercial, industrial and trade sites in Victoria.



The Noise Protocol uses two approaches to setting recommended noise limits, depending on where the industry is located:

- In larger cities at the urban fringe of Melbourne (Noise Protocol 'major urban areas'), or an 'Urban Centre' defined as a land within the 'Urban Centre boundary' (as defined by the Australian Bureau of Statistics) or having a population greater than 7000, the Noise Protocol uses the procedures set out in Part 1 A 1: Noise limits – Urban Area Method to set recommended levels.
- In 'rural areas' including small towns, the Noise Protocol has a separate procedure for setting recommended levels. When using this procedure, noise limits are determined based on the procedures set out in Part 1 A 2: Noise limits – Rural Area Method to set recommended levels.

Kongwak had a population of 207 at the 2021 census, hence noise limits are established using the Rural Area Method.

Part II of the Noise Protocol prescribes noise limits for indoor and outdoor premises, and provides details on noise measurement procedures, including the measurement of background levels and adjustments to determine effective noise levels. Noise Limits are based on the combination of the Background Noise Levels and the time period being measured. The Background Noise Levels and Noise Level from the premises are measured at a point within a "Noise Sensitive Area", usually the nearest residence or a site of complaint. The music noise level measured within the Noise Sensitive Area is known as the effective noise level and is compared to the Noise Limit to determine compliance.

Table 3.2 defines the times for the day/evening and night operating periods for indoor premises.

<b>Table 3.2 – Noise Protocol Part II Time Periods (Indoor Music Venues)</b>				
<b>Period</b>	<b>Parameters</b>			
	<b>Monday to Friday (other than a public holiday)</b>	<b>Saturday (or any day preceding a public holiday)</b>	<b>Sunday or Public Holiday (if neither is preceding a public holiday)</b>	<b>Sunday or Public Holiday (if either is preceding a public holiday)</b>
<b>Day/ Evening</b>	0700 – 2300	0700 – 2300	0900 - 2200	0900 - 2300
<b>Night</b>	2300 - 0700	2300 - 0900	2200 - 0700	2200 - 0900

## **4 NOISE MEASUREMENTS**

---

### **4.1 Equipment**

---

Attended sound pressure level measurements were performed using an NTi Audio XL2 Type 1 sound level meter with built-in real time integrating/averaging and 1/3<sup>rd</sup> octave band filters.

Non-attended measurements were performed with a Svantek 958A Type 1 noise loggers with built-in real time integrating/averaging and 1/3<sup>rd</sup> octave band filters

The sound level meters and noise loggers were all calibrated prior to and following the assessment using an external acoustic calibrator. No significant drift in calibration was measured. All equipment has current calibration certificates traceable back to the National Standard.

### **4.2 Environmental Noise Measurements**

---

Attended and unattended background sound level measurements were performed between the 16<sup>th</sup> and 21<sup>st</sup> of December 2022. Attended measurements were obtained by positioning the sound level meter outdoors, fixed to a tripod approximately 1.5 meters above ground level and at least 4 meters from any reflective surface.

Attended and unattended measurements of the Background Noise Levels were conducted at the front of a vacant residential building at 1492 Korumburra-Wonthaggi Rd and in an open field at the end of Brownes Rd. Figure 4.2 below provides an aerial map of the area identifying the attended and unattended background noise monitoring location.

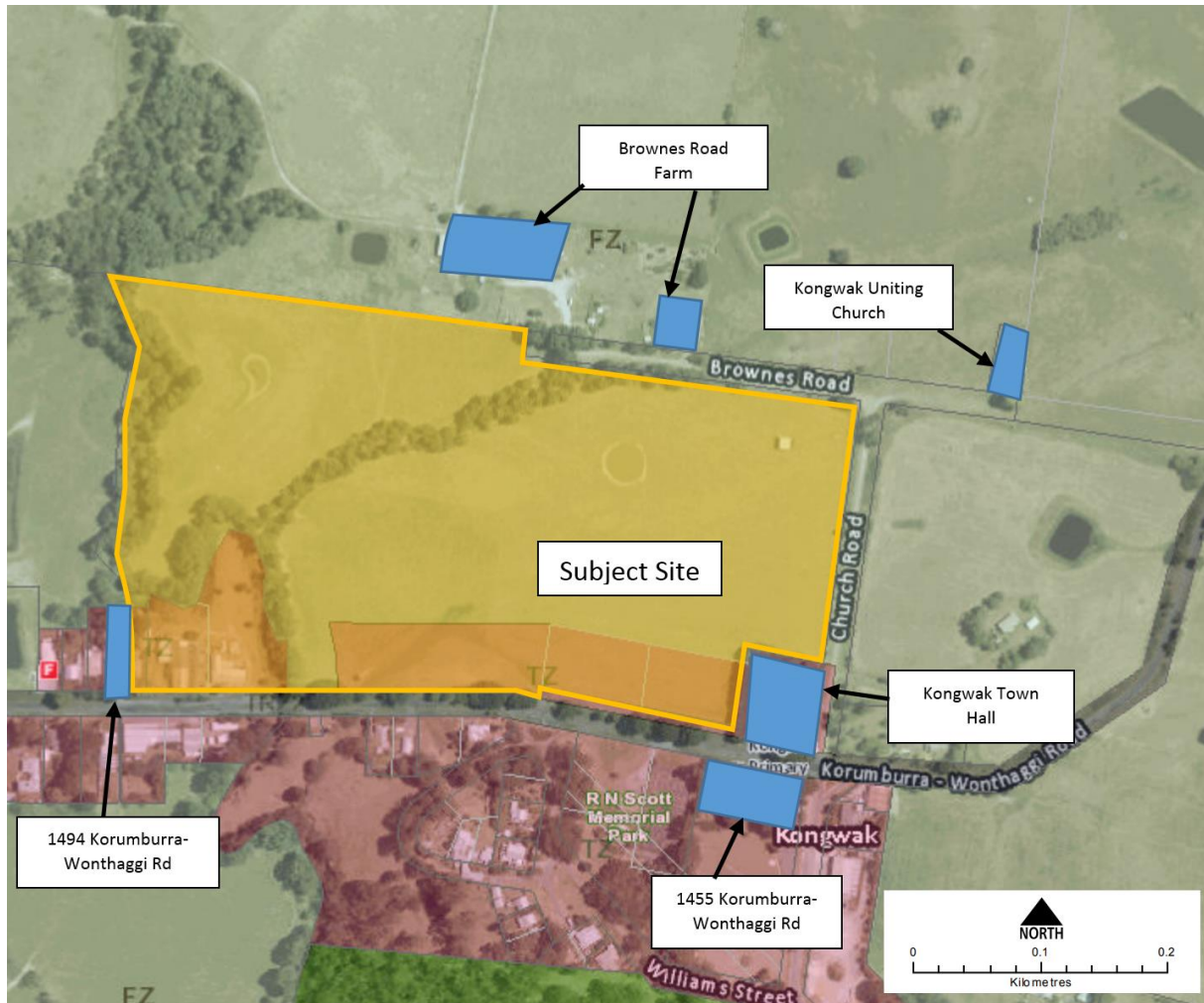
The noise sources noted during the attended measurements included noise from local traffic, birds and insects.



**Figure 4.2: Background Noise Monitoring Locations**

### 4.3 Nearest Noise Sensitive Receivers

The nearest noise sensitive receivers to the proposed development are along Korumburra-Wonthaggi Rd, adjacent to, or opposite, the site.



**Figure 4.3– Subject Site and Locations of Nearest NSRs**

The Noise Sensitive Receivers (NSRs) that will be used for determining compliance are presented in Table 4.3 which details the location of the nearest identified NSRs.

<b>Table 4.3 – Nearest NSRs to the Proposed Development</b>	
<b>NSR</b>	<b>Location</b>
1	Kongwak Town Hall
2	1455 Korumburra-Wonthaggi Road
3	1494 Korumburra-Wonthaggi Road
4	Brownes Road Farm
5	Kongwak Uniting Church

## 5 OBSERVATIONS

### 5.1 Weather Conditions

Rainfall data was obtained from Outrim station (Station No. 086194 - 7.3km away) whilst the temperature, wind and MSL pressure data were obtained from Pound Creek station (Station No. 085099 - 12.6km away). Refer table below from the local Bureau of Meteorology weather station.

Date	Temperature (°C)		Rainfall (mm)	Wind				MSL pressure (hPa)
	Min	Max		am Dir	am Speed (km/h)	pm Dir	pm Speed (km/h)	
16/12/2022	8.8	19.4	0	ESE	9	SSE	15	1020.1
17/12/2022	7	20.2	0	ENE	11	ESE	19	1023.5
18/12/2022	9.5	19.8	0	E	24	ESE	31	1024.6
19/12/2022	9.3	21.7	0	E	20	E	30	1024.1
20/12/2022	9	21.4	0	ENE	20	ESE	33	1020.2
21/12/2022	9.6	23.1	0	ENE	19	E	26	1013.4

### 5.2 Noise Measurement Observations

General observations from the noise measurements conducted during the day, evening and night time periods include intermittent road traffic, bird calls, animal noise and insect noise.

## 6 RESULTS

### 6.1 Background Noise Measurements

Background noise level results for environmental noise assessments can vary depending on the location, time and season. During the environmental noise assessment, unattended background monitoring was conducted for a 24 hour period between the 16<sup>th</sup> and 21<sup>st</sup> December 2022 at 1494 Korumburra-Wonthaggi Rd and a open field at the end of Brownes Rd. Attended measurements were also conducted on the 16<sup>th</sup> and 21<sup>st</sup> December at the two locations. Monitoring data has been excluded for wind speeds above 17km/h and rainfall greater than 2mm where applicable. Table 6.1.1 details the results of the background noise level results.

<b>Table 6.1.1 – Background Monitoring Noise Level Results</b>	
<b>Period</b>	<b>Background Noise Level L<sub>90</sub> dB(A)</b>
<b>1492 Korumburra-Wonthaggi Rd</b>	
Day	39
Evening	37
Night	30
<b>Brownes Road</b>	
Day	39
Evening	37
Night	29

Background measurements for Indoor Music Venue (Noise Protocol Part II) is detailed in Table 6.1.2 have been determined as being representative of the time periods assessed. Periods where the venue noise was measurable were removed from results.

<b>Table 6.1.2: Noise Protocol Part II (Indoor Music Venue) - Background Noise Levels</b>								
<b>Period</b>	<b>Total L<sub>90</sub> dB(A)</b>	<b>L<sub>90</sub> dB (Z) Octave Band Centre Frequency, Hz</b>						
		<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>
Day	39	-	-	-	-	-	-	-
Evening	37	-	-	-	-	-	-	-
Night	-	27	25	24	24	25	25	23

## 6.2 Noise Protocol Noise Limits

The noise limits are set using the methodology set out in EPA Publication 1826 – Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Noise Protocol).

Kongwak has a population of 207, 2021 Census, and therefore the rural area method in the Protocol is applicable. Noise limits are determined based on the zoning of the generating zone and the receiving zone, with distance adjustments if necessary.

The proposed development will be in the Town Zone (TZ). The nearest noise sensitive receiver is located in the Town Zone adjacent to the development at 1492 Korumburra-Wonthaggi Rd. The nearest NSR in the adjoining FarmZone(FZ) is the farm at the end on Brownes Rd, approximately 400m away. Based on Table B.1 from the Noise Protocol the noise limits for the NSRs are provided in Table 6.2.

Table 6.2 –Noise Protocol Noise Limits Calculations				
Location	Period	Zoning Level	Distance adjustment	Noise Limit dB(A)
1494 - Korumburra-Wonthaggi Road	Day	46	0	46
	Evening	41	0	41
	Night	36	0	36
Farm Zone (FZ) - Brownes Road	Day	46	4	43
	Evening	41	4	37
	Night	36	4	32

## 6.3 Effective Noise Limits

The effective noise limit for the sites is derived from the greater of the Zone Level or the background level plus 8dB for day period, or plus 5 dB for evening and night.

Table 6.3 –Noise Protocol Noise Limits Calculations				
Location	Period	Zoning Level Limit	Background Level Limit	Effective Noise Limit dB(A)
1494 - Korumburra-Wonthaggi Road	Day	46	47	47
	Evening	41	42	42
	Night	36	35	36
Farm Zone (FZ) - Brownes Road	Day	43	47	47
	Evening	37	42	42
	Night	32	34	34

#### **6.4 Entertainment Venue Noise Limits**

The noise limits for music from an outdoor entertainment venue and for music from an outdoor venue is 65 dBA when measured outside at a noise sensitive area. It is assumed that there will not be any outdoor music as defined in Regulations 125.

For an indoor entertainment venue the noise limit for the day and evening periods is  $L_{A90} + 5\text{dB}$ . Based on the background noise measurements in Table 6.1.1 the noise limits for 1494 Korumburra-Wonthaggi Rd and the Brownes Rd farm are 44 dB for the day period and 42 dB for the evening period.

The night-time background levels and calculations of music noise limits are presented in Table 6.4 below.

<b>Table 6.4: Indoor Music Venue Night-time Noise Limits Calculations</b>							
	<b>Frequency (Hz) / dB(lin)</b>						
	<b>63</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>
Measured background noise level $L_{OCT90}$ dB	27	25	24	24	25	25	23
Noise protocol criteria Noise Limit adjustment dB	+8	+8	+8	+8	+8	+8	+8
<b>Noise limit dB (lin)</b>	<b>35</b>	<b>35</b>	<b>32</b>	<b>32</b>	<b>33</b>	<b>33</b>	<b>31</b>



## **7 NOISE MODELLING**

---

### **7.1 Model Details**

---

Noise modelling can be a powerful tool in assessing noise from an industry facility with a large number of noise sources. It can accurately predict what noise sources are the main contributors to noise emissions in the surrounding environment and how the noise environment will change when the dominant noise sources are acoustically treated.

Noise modelling of the proposed facility and the surrounding environment has been prepared by utilising SoundPLAN software to determine the noise impact these facility have on nearby NSR's. The model includes but is not limited to the following:

- Topographic data pertinent to the local area
- Location and elevation of relevant Kongwak Butter Factory Co. Pty Ltd Kongwak redevelopment
- Location, elevation and directionality of major noise sources associated with the facility operations
- Location and elevation of noise sensitive receivers
- Location and elevation of miscellaneous buildings and structures in the propagation path between source and receiver

The above data has been sourced from the following locations:

- Topographical data – land.vic.gov.au – Vicmap Elevation 10-20m contour maps
- Proposed plans.
- Noise source locations and levels – Determined using JTA's noise source database.
- Noise sensitive receivers locations – Determined during attended measurements survey and from topographical data and aerial photographs
- Miscellaneous building locations – Determined during attended measurements survey and from topographical data and aerial photographs

The model is constructed from the following elements:

- Proposed Plans for the subject site
- Noise sources from the JTA noise database
- Residential buildings
- Ground absorption areas
- Calculation areas
- Contour elevation lines
- Grid surface elevation points
- Other terrain associated files

Appendix III details the Noise Contour Maps for Day, Evening and Night times.

Significant changes to locations or plant sound levels are to be reviewed for noise impacts.

## 7.2 Effective Noise Level Calculations – Current Design

### Proposal

Table 7.2 details the relevant- adjustments to the modelled level to obtain the effective noise level of site activities at the representative NSR zone locations.

Location	Period	Noise Level without Noise Protection Wall dB(A)	Adjustments <sup>1</sup>	Effective Noise Level dB(A)	Noise Limit dB(A)	Compliance
1494 Korumburra - Wonthaggi Road	Day	45	-2	43	47	Yes
	Evening	44	-2	42	42	Yes
	Night	37	-2	35	36	Yes
Farm Zone (FZ) - Brownes Road	Day	40	-	-	47	Yes
	Evening	39	-	-	42	Yes
	Night	27	-	-	34	Yes

<sup>1</sup>Adjustment include a 2.4m noise protection wall at the carpark facing 1494 Korumburra-Wonthaggi Road

Noise contour maps have been produced of the facility noise emissions to the surrounding environment. The noise maps in Appendix VI are for the proposed facility's noise emissions with the receiving height at 1.7 metres above ground level.

## 7.3 Model Inputs

Table 7.3 details the noise sources which are the main contributors to noise emissions used in the noise modelling to simulate the noise levels. Note the development is at an early design stage the values for the plant items represent a maximum design noise level. Final selections and locations to be assessed as the project moves in to the detailed design stages. Similarly, the noise from the vehicle movements and site operations are based on JTA experience for similar developments and are to be reviewed as the project moves in to the detailed design stages.

S/n	Name	Noise Source	Source Sound Power
1	Butter and Cheese Factory commercial buildings	Patrons at Open Air Lawn	L <sub>w</sub> = 62.0 dB(A)
2		Music	L <sub>w</sub> = 75.0 dB(A)
3		Patrons dining at Restaurant	L <sub>w</sub> = 75.0 dB(A)
4		Patrons dining at Dining Room	L <sub>w</sub> = 65.0 dB(A)
5		Kitchen Exhaust – Located behind main building away from carpark	L <sub>w</sub> = 86.2 dB(A)
6		Air Conditioning Unit (Axial-flow Fan) – 5 units	L <sub>w</sub> = 70.3 dB(A)
7	Accommodation	Air Conditioning Unit (Axial-flow Fan) – 41 units	L <sub>w</sub> = 70.3 dB(A)
8	Primary Carpark	Carpark (30 Lots)	L <sub>w</sub> = 85.1 dB(A)
9	Overflow Carpark	Carpark (30 Lots)	L <sub>w</sub> = 85.1 dB(A)

A 2.4 metre high noise protection wall has been added to the model at the carpark facing 1494 Korumburra-Wonthaggi Road to reduce the effective noise levels for compliance with the night time noise limits. The absorption coefficient of the noise protection wall with panelling of at least 10kg/m<sup>2</sup> is as follows:

	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Absorption Coefficient	0.1	0.05	0.06	0.07	0.09	0.08

## 7.4 Model Results

Table 7.4.1 details the model results for both scenarios with and without the noise protection wall installed.

Without Noise Protection Wall:

S/n	Receiver	L <sub>Aeq</sub> Day dB(A)	L <sub>Aeq</sub> Evening dB(A)	L <sub>Aeq</sub> Night dB(A)
1	Kongwak Town Hall	37	35	26
2	1455 Korumburra-Wonthaggi Road	30	29	24
3	1494 Korumburra-Wonthaggi Road	45	44	37
4	50 Brownes Road	40	39	27
5	Kongwak Uniting Church	35	34	23

With Noise Protection Wall:

S/n	Receiver	L <sub>Aeq</sub> Day dB(A)	L <sub>Aeq</sub> Evening dB(A)	L <sub>Aeq</sub> Night dB(A)
1	Kongwak Town Hall	37	35	26
2	1455 Korumburra-Wonthaggi Road	30	29	24
3	1494 Korumburra-Wonthaggi Road	43	42	35
4	50 Brownes Road	40	39	27
5	Kongwak Uniting Church	35	34	23

The proposed redevelopment has been modelled with two internal speaker system, with the contribution from each speaker of 70 dB(A) at 1 metre. Based on this description, JTA has chosen a L<sub>eq</sub> reverberant music noise level of 71 dB(A) inside the Butter and Cheese Factory commercial building with speakers arranged evenly within the space. See Table 7.4.2 below for details.

	L <sub>eq</sub> dB(A)	Parameter	Frequency (Hz) / dB(Z)						
			63	125	250	500	1K	2K	4K
Internal Reverberant Background Music Noise Level	71	L <sub>eq,oct</sub> dB	79	73	66	68	65	63	62

Higher internal reverberant noise levels would result in levels being above background noise levels and would impact on communication between patrons.

## 8 RECOMMENDATIONS

Using the results obtained from the noise model and the environmental noise assessment; noise control measures are to be developed and designed to reduce noise emissions from the subject site. The key noise sources are listed below:-

- Accommodation
- Butter and Cheese Factory Commercial Premises
- Carpark

Using the results obtained from the noise model and the environmental noise assessment; noise control measures have been recommended to control noise emissions from the proposed development at the subject site.

Mitigation measures have been chosen which will achieve compliance at all NSR locations for the measured operating conditions.

The table below lists the dominant noise sources for the subject site and recommendations for reducing the impact of the noise sources.

<b>Table 8.1: List of Noise Control Measures</b>	
Acoustic Barrier	Install 2.4m high wall at boundary to adjacent residential sub-division with panelling of at least 10kg/m <sup>2</sup> . Wall to be continuous with no gaps. Doors to be shut when not in use.
External Mechanical Plant	Locate on roof or at ground level in acoustic enclosures as required to meet the design noise levels detailed in this report.
Waste Disposal	External waste operations to be conducted only during day time when the noise limits are less stringent.
Speaker System	Install a Noise Limiter which will be a digital limiter that measures, displays, and controls the sound pressure level in the space. It is expected to be installed within the audio chain that powers the venue speaker systems.
Cheese Factory Dining	Windows installed in acoustic frames with a minimum single 6 mm thick float glazing.
Volume Attenuation Area	Maintain existing foliage/trees between the Butter and Cheese Factory Commercial Premises and the Accommodation as well as along Brownes Road

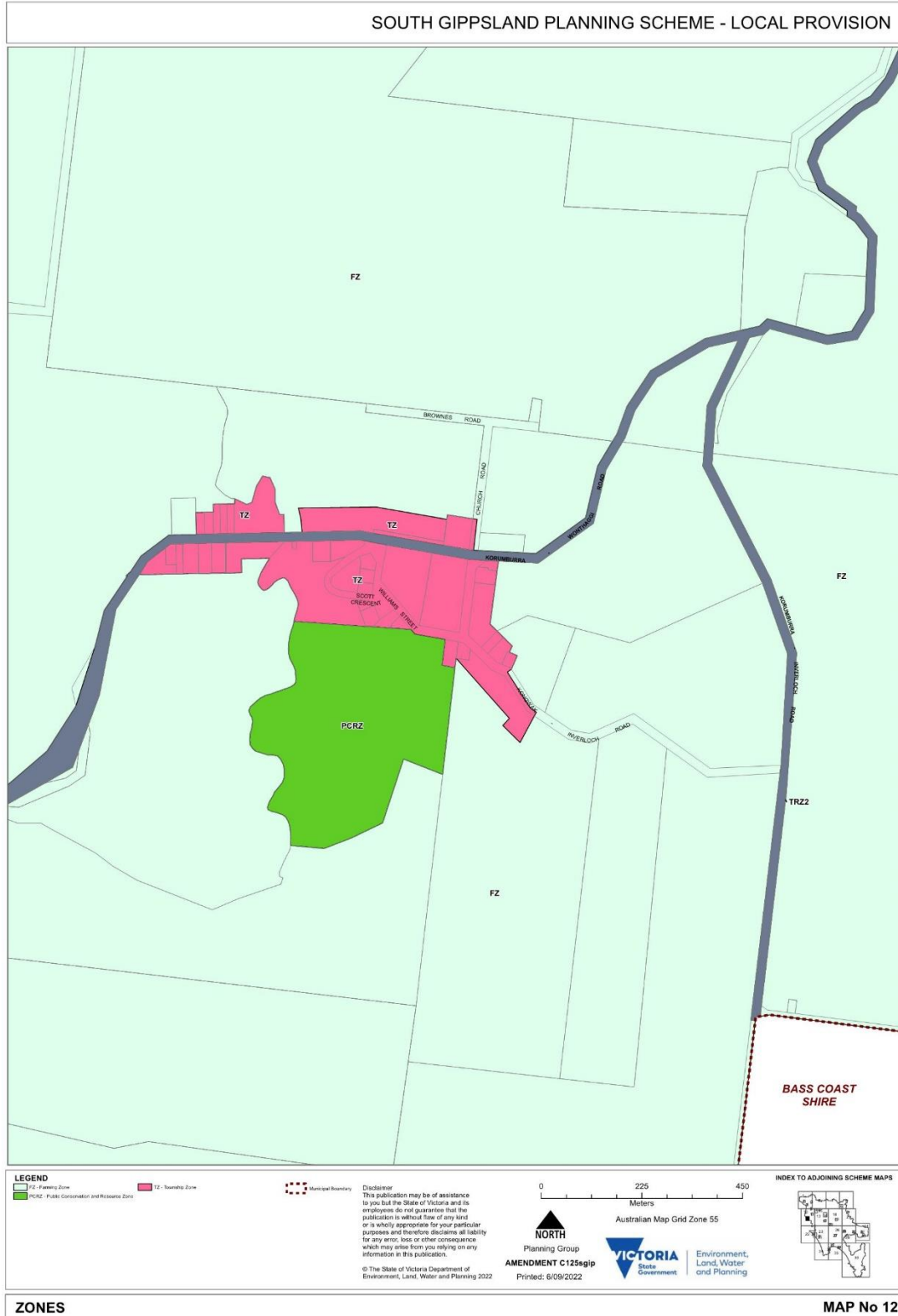
## 9 DISCUSSION AND CONCLUSION

A noise assessment has been conducted to address the requirements of the Noise Protocol and a series of control measures recommend to control noise emissions from the subject site.

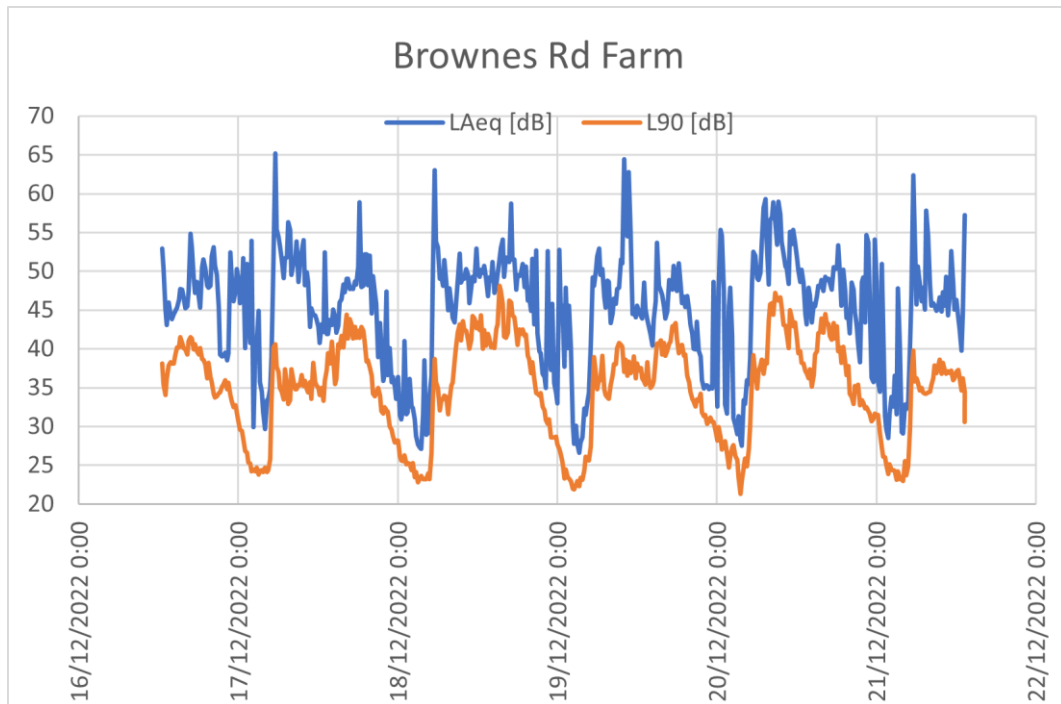
The controls are based on elimination of potential excessive noise emissions as the most effective control in the hierarchy of controls.

Implementation of the controls is recommend to minimise the noise emissions from the site for compliance with the requirements of the noise protocol.

**APPENDIX I - Zoning Map**

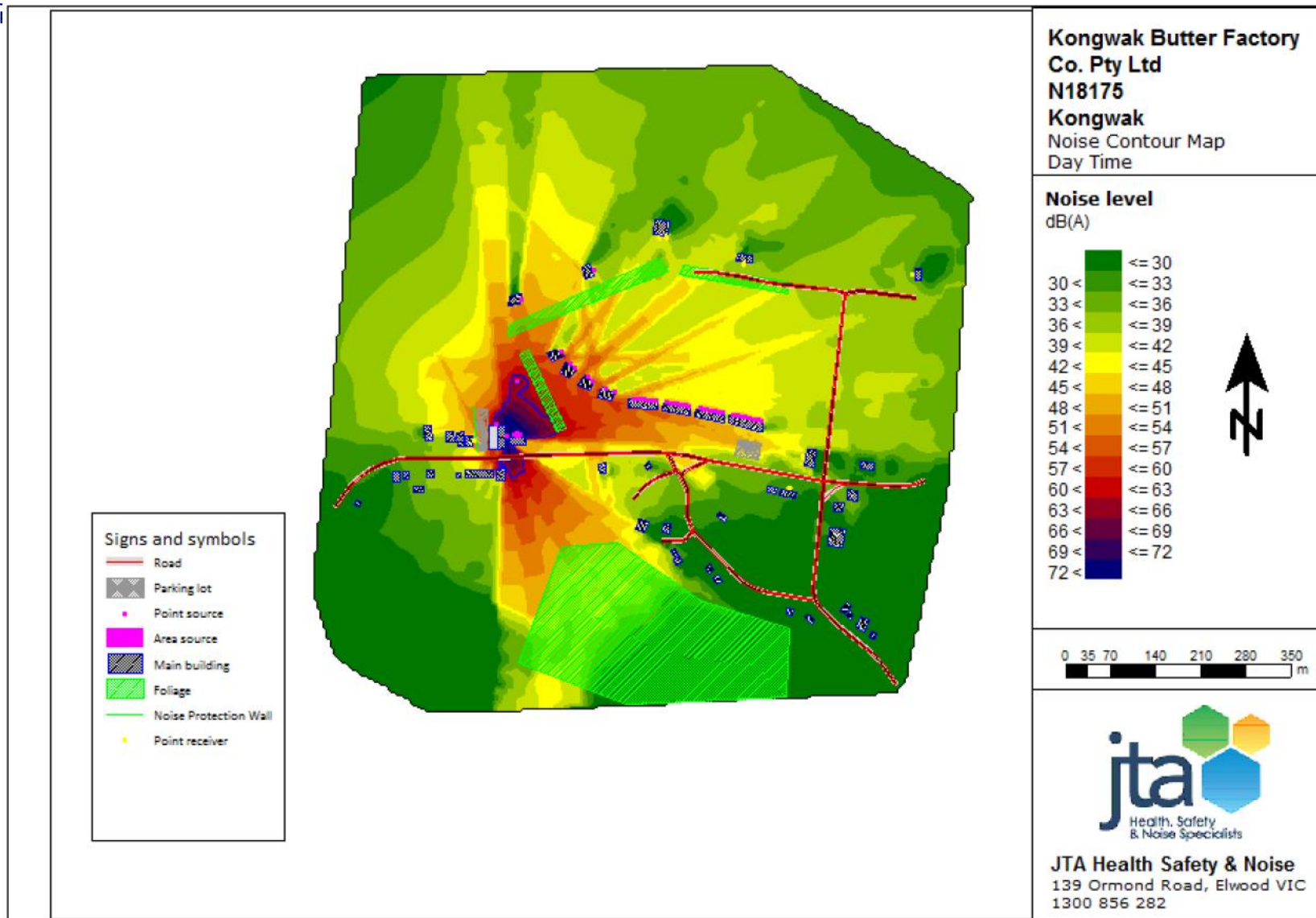


**APPENDIX II - Noise Logger Data**

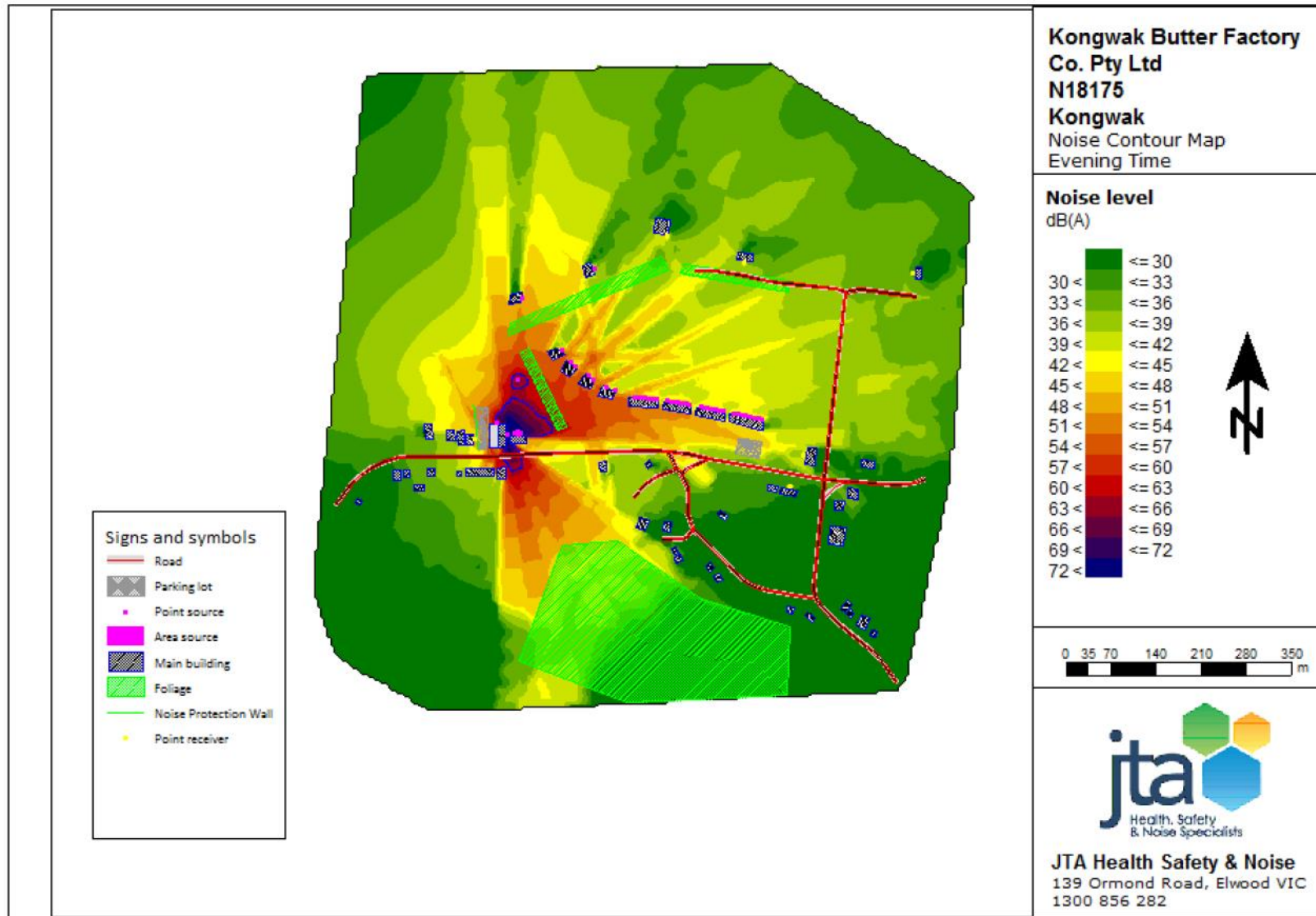


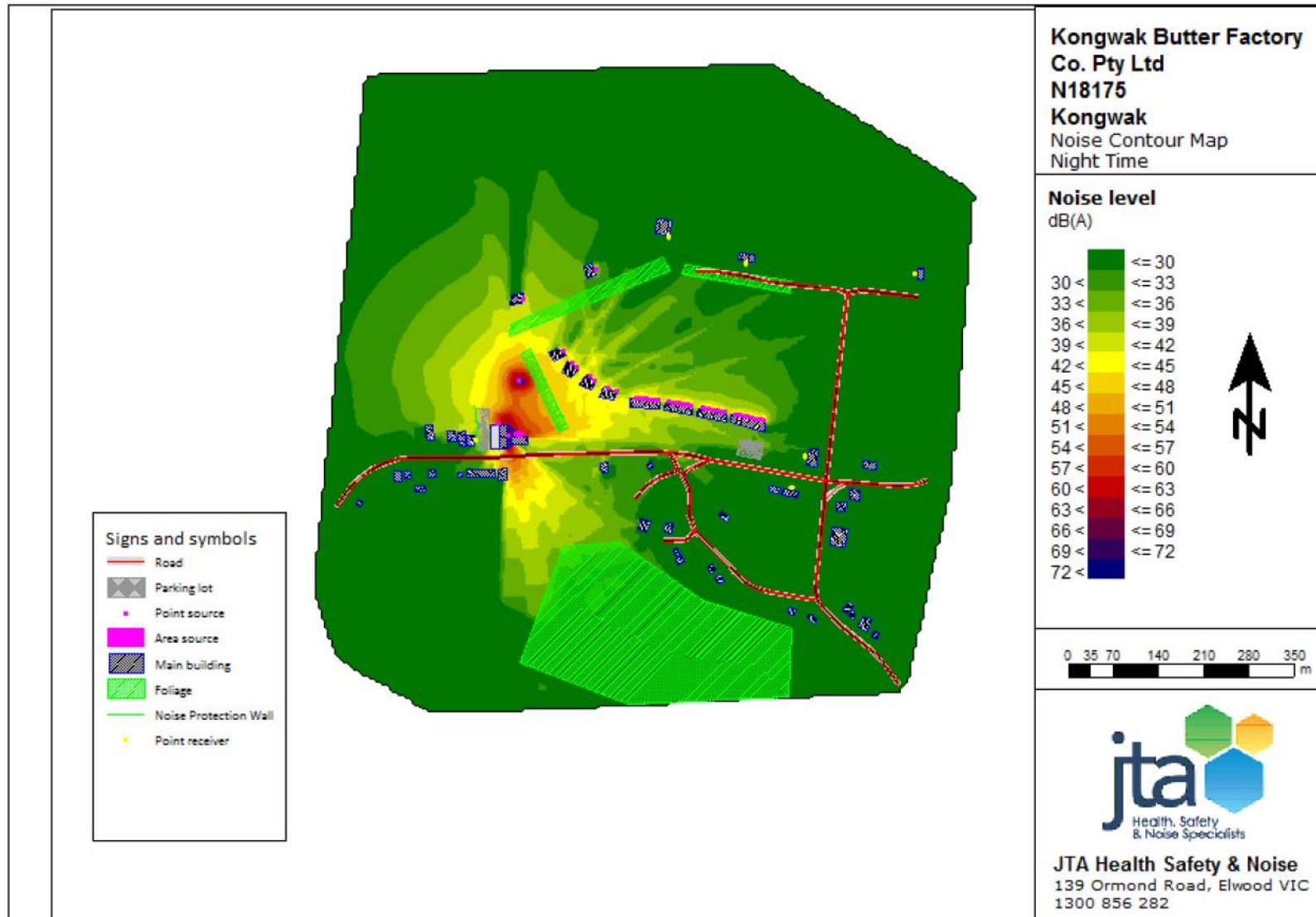
**APPENDIX III - Noise Contour Maps**

---









**APPENDIX IV – Glossary of Terms**

<b>Term</b>	<b>Definition</b>
<b>Background Noise</b>	Background noise is any <u>sound</u> other than the sound being monitored/assessed and is associated with that environment, being a composite of sounds from many sources, near and far.
<b>Extraneous Noise</b>	Extraneous noise is any noise which is not part of the noise being measured/assessed i.e. from the facility, premises or venue. Extraneous noise can include wind on vegetation or on the microphone, aircraft noise and wildlife.
<b>Noise Protocol</b>	The Noise Protocol manages the impact of noise from commercial, industrial and trade premises on residential and other noise-sensitive uses in metropolitan Melbourne and Regional Victoria.  The Noise Protocol prescribes noise limits for commercial, industrial and trade, and provides details on noise measurement procedures, including the measurement of background levels and adjustments to effective noise levels.
<b>General Environmental Duty (GED)</b>	Section 25(1) of the Environment Protection Act 2017 defines the General Environmental Duty as follows: " A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable."
<b>Noise Sensitive Receiver (NSR)</b>	A Noise Sensitive Receiver (NSR) is an identified location where sensitive personal and/or activity are located, usually a dwelling where people sleep.
<b>Effective Noise Level</b>	As defined by the Noise Protocol, the Effective Noise Level is the level of noise emitted from the commercial, industrial or trade premises and adjusted if appropriate for character and duration.
<b>Octave &amp; 1/3 octave bands</b>	The spectrum of the sound split into distinct logarithmic frequencies in Hertz (HZ).
<b>Tonal Noise</b>	Tonal noise is defined as a significant variation between a 1/3 octave band relative to its adjacent bands. An example would be a whistle blowing, where a large portion of the sound energy is focused into a narrow part of the noise spectrum.
<b>Noise Limit</b>	The Noise Limit is defined by the Noise Protocol as the maximum effective noise level allowed at a measurement point at a Noise Sensitive Receiver location.
<b>Recommended Noise Level</b>	Recommended Noise Levels according to the Noise Protocol provide different degrees of amenity protection in different land-use zones. Overall, they balance the need for operation of industry with the protection of sensitive uses. The recommended levels promote normal domestic use of the home and sleep at night.
<b>Noise Logger</b>	A noise logger is a long term noise monitoring device deployed into the field where it can operate with no direct control from a user for a significant amount of time (4 days to 2 weeks to infinite).
<b>dB(A)</b>	An expression of the relative loudness of sounds in air as perceived by the human ear. In the A-weighted system, the decibel values of sounds at low frequencies are reduced, compared with unweighted decibels, in which no correction is made for audio frequency. A unit of acoustic measurement electronically weighted to approximate the sensitivity of human hearing to sound frequency.
<b>dB(C)</b>	The C scale is practically linear over several octaves and is thus suitable for subjective measurements only for very high sound levels. Measurements made on this scale are expressed as dB(C).

Term	Definition
<b>dB(lin)</b>	dB(lin) or dB(Z) is an unweighted value of sound over a spectrum.
<b>Decibel</b>	The decibel is a logarithmic unit, used for a wide variety of measurements in science and engineering. A unit of acoustic measurement. Measurements of power, pressure and intensity may be expressed in dB relative to standard reference levels.
<b>Impulse Noise</b>	Impulse noise is noise that consists of a distinct single pressure peak, a sequence of single peaks, a single burst with multiple pressure peaks or a sequence of such bursts. Impulse noise may be the only noise present or may be superimposed on a background of a continuous noise. Impulse noise presents an additional noise hazard in that, if the peak level is sufficiently high an instantaneous injury may result.
<b>L<sub>eq</sub></b>	Equivalent continuous sound pressure level. The sound pressure level of a continuous steady sound that has the same sound energy as the actual time-varying sound. This is used commonly to represent the ambient noise level.
<b>L<sub>Aeq</sub></b>	The A-weighted equivalent continuous sound pressure level
<b>L<sub>Max</sub></b>	The maximum sound pressure level (L <sub>Max</sub> ) is the highest sound pressure level measured over a given time constant or measurement period.
<b>L<sub>A10</sub></b>	The L <sub>A10</sub> dB or L <sub>10</sub> dB(A) is the A-weighted sound pressure level which exceeds for 10 percent of the time interval considered. i.e. the average of the noisiest 10 percent of measured values over a time period.
<b>L<sub>A90</sub></b>	The L <sub>A90</sub> dB or L <sub>90</sub> dB(A) is the A-weighted sound pressure level which is exceeded for 90 percent of the time interval considered. I.e. the average of the quietest 10 percent of measured values over a time period. This is used commonly to represent the background level.
<b>Sound Pressure Level</b>	<p>A measurement of sound pressure, expressed in decibels, with respect to the threshold of hearing. The threshold of hearing is usually defined as 20 micropascals, which is assigned a value of 0 decibels.</p> <p>Ambient sound pressure level – The all-encompassing sound/noise during typical operations within an environment e.g. workshop, office, factory floor</p>
<b>Sound Power Level (L<sub>w</sub>)</b>	<p>The sound energy emitted by a sound source. I.e. where a sound wave energy is condensed to its point of origin.</p> <p>An example would be measuring a speaker at 10 metres is the sound pressure level, where if the sound wave sphere that is being generated by the speaker was shrunk back to the point of the speaker cone, that would be the sound power energy level.</p> <p>It could also be thought of as a balloon being inflated to a very large size is the sound wave growing from a point source, where the edge of the balloon skin is the edge of the sound wave front. If a small square was drawn onto the balloon when it is inflated, then if the balloon was to have air let out of it, the balloon would shrink and the square would get smaller and condense. If this was done all the way back to where the balloon had no air left then the square would be too tiny to see. This point is the Sound Power Level, where all the energy has been un-stretched back to one point.</p>