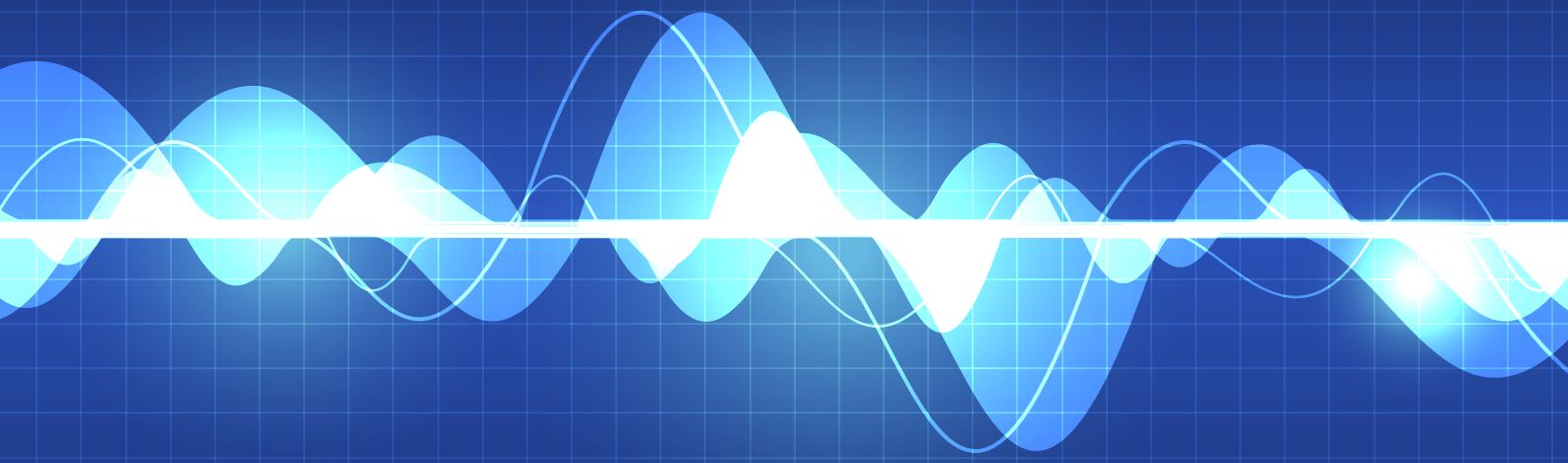
Two Tails Wines

Acoustic Assessment

Prepared for Bannerman Consulting
December 2021



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Two Tails Wines

Acoustic Assessment

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Client

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Version

Final

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1 Introduction

EMM Consulting Pty Limited (EMM) has been engaged by Bannerman Consulting to prepare an acoustic assessment for the proposed changes to the Two Tails Winery (the 'winery') located at 963 Orara Way, Nana Glen NSW.

The winery currently comprises an existing house, a detached garage, a cellar door, restaurant with internal seating and an adjoining open deck. The winery's currently approved operating hours (under DA 808/16 and 0444/17) are between 8:30 am to 10:00 pm Monday to Saturday and 9:00 am to 10:00 pm on Sundays.

Potential noise impacts associated with the operation of the venue have been assessed against the following standards and guidelines:

- Noise Policy for Industry (NPfI), NSW Environment Protection Authority (EPA), October 2017;
- Noise Guide for Local Government (NGLG), NSW EPA, May 2013;
- NSW Liquor & Gaming – standard noise condition; and
- Association of Australasian Acoustical Consultants (AAAC) 'Licensed premises noise assessment technical guideline' Version 2.0 dated November 2020 (referred herein as the 'AAAC guideline').

A number of technical terms are required for the discussion of noise. These are explained in the glossary.

It is of note that the applicant no longer relies upon the acoustic assessment by Craig Hill Acoustics dated 18 February 2019, as it is now irrelevant given the changes to the proposal.

1.1 Project description

The winery is located at 963 Orara Way, Nana Glen. The surrounding area comprises a mix of commercial and rural residential land uses.

A layout of the site is provided in Figure 2.1 and outlines the restaurant, deck, lawn and vineyard areas. The amended plans of the site and development are provided in Appendix B.

The aspects which are considered in this acoustic assessment include:

- mechanical plant and car parking noise; and
- noise from patrons and music.

2 Existing environment

2.1 Site surrounds

The surrounding area comprises a mix of commercial and rural residential land uses.

The nearest assessment locations to the winery are located directly adjacent to the winery, comprising residential and commercial properties on Orara Way. Representative assessment locations considered in the noise assessment are listed in Table 2.1 and are shown in Figure 2.1.

Table 2.1 Assessment locations

ID	Receptor Type	Address
R1	Residential	977 Orara Way, Nana Glen
R2	Residential	968 Orara Way, Nana Glen
R3	Commercial	960 Orara Way, Nana Glen
R4	Residential	956 Orara Way, Nana Glen
R5	Residential	950 Orara Way, Nana Glen
R6	Residential	923 Orara Way, Nana Glen
R7	Residential	959 Orara Way, Nana Glen

The assessment locations represent those most likely to be affected by noise from the winery. Adherence with the relevant noise goals at these locations would indicate that noise goals will be achieved at other surrounding noise-sensitive locations further from the winery. The highest noise level at the potentially worst affected position within each property was determined in accordance the noise guidelines (eg at the property boundary or 30m from the dwelling if the dwelling is more than 30m from the boundary).

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Source: EMM (2021); DFSI (2017); GA (2011); ASGC (2006)

KEY

- Site layout
- Mechanical plant
- Unattended noise monitoring location
- Existing fence
- Mitigation measure

Assessment location

- Commercial
- Residential

- Watercourse/drainage line
- Cadastral boundary
- NPWS reserve
- State forest

Site layout and assessment locations

Two Tails Wines
Acoustic assessment
Figure 2.1

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2.2 Existing background and ambient noise environment

2.2.1 Unattended noise monitoring

EMM completed unattended noise monitoring near to the premises to establish the existing ambient noise environment. A Svantek Type 977 (s/n 59681) environmental noise monitor was installed on the winery lawn, situated to the north of the restaurant, from 15 to 26 June 2020. The noise logger was calibrated before and after installation using a Brüel & Kjær 4230 calibrator (serial number 1276091). All instrumentation was within its manufacturer or NATA calibration period.

Logger results have been analysed with periods of high wind (greater than 5 m/s) and/or rain being excluded as per NPfI requirements. Weather data was sourced from EMMs portable weather station set up immediately adjacent to the unattended noise monitor.

Aural observations during site inspections confirmed the ambient noise within the vicinity of the winery were dominated by traffic on Orara Way and residential noise from adjacent rural properties.

The position of the noise monitor was chosen to be set back from Orara Way and the wineries' restaurant so that the measurements were not influenced by operational noise from the premises, and representative of the ambient noise environment experienced by the adjacent residential properties. The noise monitoring location is shown in Figure 2.1 and Photograph 2.1.

Photograph 2.1 Unattended noise monitoring location

The measured levels are presented in Table 2.2. Daily logger charts and summaries are available in Appendix A.

Table 2.2 Unattended noise monitoring results

Measurement location	Measured noise level, dB					
	RBL[1,4]			L_{Aeq}[2]		
	Day	Evening	Night	Day	Evening	Night
L1	35	30	30	47	43	40

Notes: 1. The RBL is a NPfI term and is used to represent the background noise level. The levels adopted are the final RBL are the lowest ABL as defined in the NPfI.
2. The energy averaged noise level over the measurement period and representative of general ambient noise.
3. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8am Sundays and public holidays.
4. The measured RBLs were below the NPfI minimum assumed RBLs and have been adjusted as per NPfI procedures

The representative 1/1 octave band levels ($L_{A90,15\ minute}$) for each assessment period as recorded at L1 is provided in Table 2.3.

Table 2.3 1/1 Octave band noise levels – L1

Period[1]	Octave band centre frequency (Hz) background noise level, dB $L_{Z90,15\ minute}$										Total noise level, dB(A) $L_{A90,15\ minute}$
	31.5	63	125	250	500	1k	2k	4k	8k	16k	
Day	46	43	37	29	29	31	27	23	17	17	35
Evening	45	40	34	25	24	26	22	20	17	18	30
Night	47	39	34	25	24	23	21	21	19	21	30

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8am Sundays and public holidays.

3 Noise Criteria

3.1 Noise guide for local government

The NSW EPA's Noise guide for local government (NGLG) provides relevant guidance for licenced premises, referencing at Section 1.4.1 noise conditions typically imposed by the NSW Liquor & Gaming for assessing noise associated with the operation of licensed premises. Whilst Liquor & Gaming do not have a specific noise guideline, they do have typical noise conditions which are imposed on licensed premises.

The Liquor & Gaming typical noise conditions will be used to address noise associated with patrons and music emanating from the use of the site. Noise associated with mechanical plant and vehicle movements within the carpark will be addressed against the NPfI.

The current conditions are provided in Section 1.4.1 of the NSW EPA Noise Guide for Local Government (2013) (NGLG) which states:

- The L_{A10}* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz–8 kHz inclusive) by more than 5 dB between 7:00 am and 12:00 midnight at the boundary of any affected residence.

- The L_{A10}* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz–8 kHz inclusive) between 12:00 midnight and 7:00 am at the boundary of any affected residence.

- Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00 am.

For the purpose of this condition, the L_{A10} can be taken as the average maximum deflection of the noise emission from the licensed premises.

The NGLG at Section 2.3 Measuring noise, provides guidance on determining suitable background noise levels needed for establishing criteria. This approach is consistent with the NPfI. Guidance in the NPfI applicable to this proposal extends to the minimum background levels where the RBL for an area would result in unreasonable noise targets. The minimum assessment background levels of the NPfI have been normalised to the measured background noise spectrum.

Table 3.1 provides the NGLG noise criteria for licensed premises when assessed to residential assessment locations. The project does not operate during the night period and hence criteria has not been developed post 10pm.

Table 3.1 NGLG noise criteria

Period[1]	Octave band centre frequency (Hz) background noise level, dB $L_{Z90,15\ minute}$										Total noise level, dB $L_{A90,15\ minute}$
	31.5	63	125	250	500	1k	2k	4k	8k	16k	
Day RBL	46	43	37	29	29	31	27	23	17	17	35
Day - Criteria[2]	51	48	42	34	34	36	32	28	22	22	40
Evening – RBL	45	40	34	25	24	26	22	20	17	18	30
Evening - Criteria[2]	50	45	39	30	29	31	27	25	22	23	35

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8am Sundays and public holidays.
2. Criteria is equal to the background noise level + 5 dB in each octave band as per the NGLG.
3. These criteria were calculated to be below the threshold of hearing and have been set at the equal loudness contours (ie threshold of hearing) for octave bands of noise.

3.2 Noise Policy for Industry

The NSW EPA Noise Policy for Industry (2017) (NPfI) sets assessment noise levels, consistent methods and best practice measures to manage industrial noise.

3.2.1 Intrusive noise levels

The intrusive noise trigger levels require that $L_{Aeq,15\ minute}$ noise levels from the premises during the relevant operational periods do not exceed the RBL by more than 5 dB. Table 3.2 provides the intrusive noise level for the relevant periods determined for the premises based on the adopted RBL.

Table 3.2 Project intrusiveness noise levels

Assessment location	Period[1]	Adopted RBL[2], dB	Project intrusiveness noise level, dB $L_{Aeq,15\ minute}$
Any residential premises	Day	35	40
	Evening	30	35
	Night	30	35

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8am Sundays and public holidays.
2. Minimum assumed RBL as per NPfI procedures.

3.2.2 Amenity noise levels

The assessment of amenity is based on noise levels specific to the land use. The noise levels relate only to industrial noise and exclude road or rail noise. Where the measured existing industrial noise approaches recommended amenity noise level, it needs to be demonstrated that noise levels from new industry will not contribute to existing industrial noise such that amenity noise levels are exceeded.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level for new industrial developments is the recommended amenity noise level (outlined in Table 2.2 of the NPfI) minus 5 dB. There was no existing industrial noise observed during the site visit and, as such, the project amenity noise level has been set as the NPfI recommended amenity noise level.

All receivers have been categorised in the NPfI "rural" amenity category, since they were deemed to be in "an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels.

The corresponding project amenity noise levels for the premises are given in Table 3.3.

Table 3.3 Project amenity noise levels

Assessment location	Period	Project amenity noise level, dB, $L_{Aeq,\ period}$
Any residential premises	Day	50
	Evening	45
	Night	40
Commercial premises	When in operation	65

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am Monday to Saturday, 10 pm to 8am Sundays and public holidays.

3.2.3 Project noise trigger levels

The project noise trigger level (PNTL) is the lower of the calculated intrusive or amenity noise level and is the level that will be used to assess noise impact and drive the process of assessing all feasible and reasonable control measures. These are presented in Table 3.4.

In accordance with the NPfI, +3 dB has been added to the $L_{Aeq,period}$ amenity criteria for each period (Table 3.3) so that it can be directly compared with the $L_{Aeq,15\ minute}$ intrusive criteria (Table 3.2). Note that there is no other 'industrial' noise source in the area that could contribute to the assessment locations and hence in accordance with the NPfI, a 5dB reduction to the acceptable amenity noise level has not been applied. Notwithstanding this, a 5dB correction would not alter the final PNTL derived for the project. The project does not operate during the night period and hence criteria post 10pm is not relevant.

Table 3.4 Project noise trigger levels

Assessment Location	Period[1]	Intrusive noise level, dB, $L_{Aeq,15\ minute}$	Amenity noise level, dB, $L_{Aeq,15\ minute}$	Project noise trigger level (PNTL), dB, $L_{Aeq,15\ minute}$
Any residential premises	Day	40	53	40
	Evening	35	48	35
	Night	35	43	35
Commercial premises	When in operation	N/A	68	68

Notes: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am. N/A = Not Applicable.

4 Noise assessment

4.1 Patron and music noise

In regard to patron numbers, the noise modelling to date has considered:

- a maximum of 60 patrons in the restaurant/deck area (20 patrons inside the restaurant with the doors open and 40 patrons outside on the deck);
- a maximum of 26 patrons on the outdoor concrete slab area (30 were modelled); and
- a maximum of 26 patrons in the vineyard area (40 were modelled).

The outdoor lawn and vineyard areas will not be used concurrently. It has also been assumed that the approved garage/laundry/office building has not been constructed.

The restaurant is proposed to operate between the hours of 10:00 am and 10:00 pm, Monday to Sunday. The outdoor paved area is proposed to be used between the hours of 10:00 am and 6:00 pm on Saturdays and Sundays only. The vineyard area is proposed to be used on up to three occasions per year, between the hours of 11:00 am and 4:30 pm.

There are a number of mitigation measures that have been employed to reduce noise impacts at nearby assessment locations. These include (refer to Figure 2.1):

- a 2.4m high solid (eg lapped and capped timber) fence running adjacent to the northern property boundary to the west of the existing house;
- a 2.4m high solid (eg lapped and capped timber) fence running adjacent to the north of the concrete slab;
- a new roof and bifold doors along the northern and eastern sides of the restaurant's deck area as shown in the attached drawings. The northern deck doors are only required to be closed during evening operations and when the lawn is in use, while the eastern deck doors are required during all the evening operations; and
- 90m^2 of absorptive lining (NRC 0.7) attached to the ceiling of the outdoor deck area.

4.1.1 Methodology

Previous noise modelling completed by EMM in August and September 2020 (the latter done in consultation with Council's acoustic expert Dr Tonin) adopts that:

- the indoor restaurant is an internal reverberant area (indoor sound pressure levels were determined using the Rindel calculation and a Sabine equation was utilised to determine reverberation time);
- the deck is a reverberant space . To that end, all doors are required to be closed during the evening period and the northern doors only are required to be closed when the lawn is also in use (indoor sound pressure levels were determined using the Rindel calculation and a Sabine equation was utilised to determine reverberation time); and
- music level in the restaurant is for background effect only, while in outdoor areas (lawn and vineyard) is only audible to patrons nearby.

Patrons in the outdoor lawn and vineyard areas have been addressed using a sound pressure level consistent with raised speech. The AAAC guideline nominates this to be 66 dB L_{Aeq} (69 dB L_{A10}) at 1m, consistent with a combination of men and women with raised speech. It is assumed that 1 in 3 patrons are talking at any one time in the outdoor lawn or vineyard areas. The noise modelling input data are presented in Appendix C.

i Rindel Method

The assessment of patron noise has been undertaken utilising the noise model provided in Rindel, J H, 2012, Acoustical capacity as a means of noise control in eating establishments, paper presented at BNAM2012 Odense, Denmark June 2012.

The Rindel (2012) noise model describes ambient noise levels generated by groups of people within eating establishments with consideration to the size of the establishment and average absorption within the space. This model is adopted in the aforementioned AAAC guideline 'Licensed premises noise assessment technical guideline'.

The Rindel (2012) model predicts the L_{Aeq} sound pressure level within a restaurant space and is calculated using Equation 1 as described below:

$$L_{N,A} = 93 - 20\log\left(\frac{A}{Ns}\right) = 93 - 20\log\left(\frac{A*g}{N}\right)\ dB \qquad \text{Equation 1}$$

Where:

- $L_{N,A}$ is the internal sound pressure level (L_{Aeq}) within the tenancy from vocal effort;
- A is the equivalent absorption area in m^2 calculated using the Sabine equation;
- N_S is the number of patrons speaking;
- N is the number of patrons; and
- g is the size of each group.

The size of each group is relevant as it describes how many patrons are talking at once, (ie one patron assumed talking in a group of three patrons would constitute a 'g' value of 3).

The vocal effort of each patron speaking can be described by the following equation:

$$L_{S,A,1m} = 55 + c\ (L_{N,A} - 45)\ dB \qquad \text{Equation 2}$$

Where:

- $L_{S,A,1m}$ is the vocal effort per speaking patron; and
- c is the Lombard ratio (Lombard effect).

The Lombard effect is the phenomena where patrons, when subjected to noise, will raise their voice (ie the louder the noise is within a space or crowd, the louder the vocal effort).

The noise model has been based on the reverberant sound pressure levels provided in Table 4.1 within the restaurant and on the deck which has been calculated in accordance with the Rindel method. A group size 'g' of three has been assumed.

Table 4.1 Patron source noise levels – internal areas

Scenario / location	Volume	Seats	Reverberation time, R_T (s)[1]	Internal sound pressure level, dB L_{Aeq} / L_{A10}[2]	Patron vocal effort at 1m, dB L_{Aeq}[3]/ L_{A10}
Internal (Restaurant)	200	20	0.89	77 / 80	71 / 74
Deck (Doors Open)	216	40	0.22	71 / 74	68 / 71
Deck (North Closed)	216	40	0.28	73 / 76	69 / 72
Deck (Doors Closed)	216	40	0.39	76 / 79	70 / 73

Notes:1. Reverberation time calculated using the design drawings provided by Bannerman Consulting. Entry and bi-fold doors in each scenario / location have been considered in the calculation of reverberation times depending on whether they are open or closed.

2. Sound pressure level calculated using Equation 1.

3. Vocal effort calculated using Equation 2.

4. The L_{A10} noise level has been approximated by L_{Aeq} + 3dB consistent with the AAAC guideline.

Whilst there is significantly higher acoustic absorption within the deck area (ie openings on three sides, acoustically absorptive ceiling), the number of patrons will elevate noise levels due to the Lombard effect. The contributing factor to noise within the restaurant is due to the reverberant nature of the internal area, despite the number of patrons inside being significantly less than that outdoors on the deck.

4.1.2 Modelling scenarios

The noise modelling has adopted four operating scenarios covering the two periods day and evening. These are:

- Restaurant (includes 20 patrons inside and 40 patrons on the open deck) operations during the daytime period.
- Restaurant (includes 20 patrons inside and 40 patrons on the closed deck) operations during the evening period.
- Restaurant (includes 20 patrons inside and 40 patrons on the open deck) and outdoor paved area (26 patrons) operations during the daytime period.
- Restaurant (includes 20 patrons inside and 40 patrons on the open deck) and vineyard area (26 patrons) operations during the daytime period.

4.1.3 Results

Table 4.2 presents the predicted noise levels from patron and music noise at the nearest assessment locations. The results demonstrate noise criteria will be satisfied at all locations.

Table 4.2 Predicted noise levels

Assessment location	Prediction/criteria	1/1 octave band centre frequency (Hz) noise levels, dB $L_{A10,15\ minute}$							Total noise level, dB
		125	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
R1	Restaurant (Day)	20	23	30	28	23	14	0	-
	Restaurant + Outdoor Paved Area (Day)	16	22	30	28	24	15	1	-
	Restaurant + Vineyard (Day)*	19	23	31	33	29	23	9	-
	Criteria (Day)	**26**	**25**	**31**	**36**	**33**	**29**	**21**	-
	Restaurant (Evening)	8	12	17	13	7	0	0	-
	Criteria (Evening)	**23**	**21**	**26**	**31**	**28**	**26**	**21**	-
R2	Restaurant (Day)	17	19	26	26	22	15	0	-
	Restaurant + Outdoor Paved Area (Day)	16	18	27	27	23	16	2	-
	Restaurant + Vineyard (Day)*	17	19	27	27	23	15	0	-
	Criteria (Day)	**26**	**25**	**31**	**36**	**33**	**29**	**21**	-
	Restaurant (Evening)	9	12	17	14	8	0	0	-
	Criteria (Evening)	**23**	**21**	**26**	**31**	**28**	**26**	**21**	-
R3 (commercial)	Restaurant (Day)	-	-	-	-	-	-	-	36 $L_{Aeq,15\ minute}$
	Restaurant + Outdoor Paved Area (Day)	-	-	-	-	-	-	-	39 $L_{Aeq,15\ minute}$
	Restaurant + Vineyard (Day)*	-	-	-	-	-	-	-	36 $L_{Aeq,15\ minute}$
	Restaurant (Evening)	-	-	-	-	-	-	-	21 $L_{Aeq,15\ minute}$
	Criteria (When in use)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**68**
R4	Restaurant (Day)	19	17	27	32	29	23	9	-
	Restaurant + Outdoor Paved Area (Day)	19	19	29	32	30	24	10	
	Restaurant + Vineyard (Day)*	19	18	28	33	30	24	9	
	Criteria (Day)	**26**	**25**	**31**	**36**	**33**	**29**	**21**	-
	Restaurant (Evening)	14	10	15	12	12	3	0	-
	Criteria (Evening)	**23**	**21**	**26**	**31**	**28**	**26**	**21**	-
R5	Restaurant (Day)	16	13	24	28	25	19	1	-
	Restaurant + Outdoor Paved Area (Day)	16	15	26	31	27	21	3	-
	Restaurant + Vineyard (Day)*	16	15	26	29	26	20	2	-
	Criteria (Day)	**26**	**25**	**31**	**36**	**33**	**29**	**21**	-
	Restaurant (Evening)	10	6	11	11	8	0	0	-
	Criteria (Evening)	**23**	**21**	**26**	**31**	**28**	**26**	**21**	-

Table 4.2 Predicted noise levels

Assessment location	Prediction/criteria	1/1 octave band centre frequency (Hz) noise levels, dB $L_{A10,15\ minute}$							Total noise level, dB
		125	250	500	1k	2k	4k	8k	
R6	Restaurant (Day)	7	7	14	10	11	0	0	-
	Restaurant + Outdoor Paved Area (Day)	7	10	18	16	11	1	0	-
	Restaurant + Vineyard (Day)*	8	9	18	21	18	8	0	-
	Criteria (Day)	**26**	**25**	**31**	**36**	**33**	**29**	**21**	-
	Restaurant (Evening)	4	0	4	0	0	0	0	-
	Criteria (Evening)	**23**	**21**	**26**	**31**	**28**	**26**	**21**	-
R7	Restaurant (Day)	10	11	22	20	17	9	0	-
	Restaurant + Outdoor Paved Area (Day)	10	14	25	25	21	13	0	-
	Restaurant + Vineyard (Day)*	11	17	27	26	23	15	0	-
	Criteria (Day)	**26**	**25**	**31**	**36**	**33**	**29**	**21**	-
	Restaurant (Evening)	0	1	6	2	0	0	0	-
	Criteria (Evening)	**23**	**21**	**26**	**31**	**28**	**26**	**21**	-

Notes: * These results are for a higher number of patrons that what is proposed (ie 40 don to 26) and hence the results are conservative but remain within criteria.

4.2 Mechanical plant and car parking noise

4.2.1 Methodology

Quantitative modelling of mechanical plant and car parking noise was also completed using DGMR Software iNoise noise prediction software.

The mechanical plant utilised in the operation of the site, and included in the noise model, are:

- A portable Mechpro 2.2 kW petrol inverter generator operates at a water bore in the north western corner of the site. It is usually operated for a four-hour period, two times per week during the daytime period only. For the purposes of noise modelling, it has been assumed that the generator will operate continuously during any 15-minute period during the daytime period. A casing will be used to house the generator when used in this location;

- A Kirby Polar condensing unit operates at the south western corner of the restaurant building. It is programmed to operate intermittently, ensuring that the restaurant cool room is kept at an optimum temperature. For the purposes of noise modelling, it has been assumed that the condensing unit will operate continuously during any 15-minute period during the daytime, evening or night-time periods; and

- The on-site car park is used to accommodate the cars of restaurant and winery patrons and is located at the south east of the site. Assuming the facility is at capacity (ie 104 patrons in the day and 60 patrons in the evening), modelling adopted 19 cars (9.5 in and 9.5 out) and 10 cars (5 in and 5 out) arriving or leaving in any 15-minute period during the daytime and evening periods, respectively. These volumes are an update of what was in the noise model previously and are sourced from the de Groot & Benson traffic impact assessment (TIA) report (3/12/21) which was completed following our previous noise assessment. The TIA recommends adopting 2.5 (rounded to 3) patrons per vehicle for operations. Cars are assumed to be idling/moving in the carpark for up to 5 minutes in any 15-minute period.

The modelling also assumes that the approved garage/laundry/office building has not been constructed.

Site inspection and review of plant details confirm the mechanical plant sound power levels. These emission values and that for car parking noise are summarised in Table 4.3.

Table 4.3 Mechanical plant and car parking noise sources

Make and Model	Quantity	Location	Sound Power Level, Lw, dB(A)
Mechpro 2.2kW Petrol Inverter Generator[1, 3]	1	North western corner of the site	83
Kirby Polar Condensing Unit[1]	1	South western corner of the restaurant	82
Light vehicle movements[2]	16	Site car park	78.5

Note: 1. Measured by EMM.
2. Sourced from Dr Tonin's advice.
3. This plant is assumed to operate in a casing (quoted is the no casing SWL).

4.2.2 Results

Quantitative modelling was completed using DGMR Software iNoise noise prediction software. Noise from the mechanical plant and car parking as per Table 4.3 has been assessed to the nearest assessment locations. Modelling has considered simultaneous operation of all plant, operating location, distance between source and assessment location, and shielding where applicable.

Table 4.4 presents the predicted noise levels from mechanical plant and car parking noise at the nearest assessment locations.

Table 4.4 Mechanical plant and car parking noise results

Assessment location	Period	Predicted noise level, $L_{Aeq,15\ minute}$, dB	Project noise trigger level, $L_{Aeq,15\ minute}$, dB	Exceedance, dB
R1	Day	<40	40	Nil
	Evening	35	35	Nil
	Night	<35	35	Nil
R2	Day	<40	40	Nil
	Evening	<35	35	Nil
	Night	<35	35	Nil
R3	Day	<68	68	Nil
	Evening	<68	68	Nil
	Night	<68	68	Nil
R4	Day	<40	40	Nil
	Evening	35	35	Nil
	Night	<35	35	Nil
R5	Day	<40	40	Nil
	Evening	<40	35	Nil
	Night	<35	35	Nil
R6	Day	<40	40	Nil
	Evening	<30	35	Nil
	Night	<35	35	Nil
R7	Day	40	40	Nil
	Evening	<35	35	Nil
	Night	<35	35	Nil

Notes: 1. The night-time operations only include the Kirby Polar Condensing Unit needed to keep food refrigerated.

The noise modelling results confirm that the relevant NPfI project noise trigger levels are achieved at all assessment locations under noise-enhancing meteorological conditions.

5 Conclusion

EMM has conducted a noise impact review for proposed operational changes to the Two Tails Winery located at 963 Orara Way, Nana Glen NSW 2450.

The study included baseline noise monitoring, establishing noise criteria, three-dimensional noise modelling, assessment of predicted noise levels and provides mitigation measures. The required mitigation measures (as presented in Figure 2.1 and amended plans in Appendix B) include:

- a 2.4m high solid (eg lapped and capped timber) fence running adjacent to the northern property boundary to the west of the existing house;
- a 2.4m high solid (eg lapped and capped timber) fence running adjacent to the north of the concrete slab;
- a new roof and bifold doors along the northern and eastern sides of the restaurant's deck area as shown in the attached drawings. The northern deck doors are only required to be closed during evening operations and when the lawn is in use, while the eastern deck doors are required during all evening operations;
- 90m^2 of absorptive lining (NRC 0.7) attached to the ceiling of the outdoor deck area; and
- a casing used to house the inverter generator when used at the water bore location.

Based on noise modelling completed by EMM and amended plans presented herein, the enclosing of the deck area as proposed will result in a positive acoustic outcome for all neighbouring assessment locations and ensure the proposed operations will comply with all relevant Liquor & Gaming NSW criteria for all assessment locations.

The assessment also considered operation of mechanical plant and car parking noise and confirmed these can satisfy the relevant NPfI assessment criteria.

Glossary of acoustic terms

Technical terms typically utilised in a noise assessment report are explained in Table G.1.

Table G.1 Glossary of acoustic terms and abbreviations

Abbreviation or term	
ABL	The assessment background level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L_{A90} statistical noise levels.
Amenity noise criteria	The amenity noise criteria relate to the overall level of industrial noise. Where existing levels of industrial noise (excluding the subject development) approach the acceptable amenity noise criteria, then noise levels from new industries need to demonstrate that they will not be an additional contributor to existing industrial noise.
A-weighting	There are several different weightings utilised for describing noise, the most common being the 'A-weighting'. This attempts to closely approximate the frequency response of the human ear.
C-weighting	There are several different weightings utilised for describing noise, with the 'C-weighted' scale typically used to assess low frequency noise and is also utilised in the assessment of occupational noise.
Day period	Monday–Saturday: 7.00 am to 6.00 pm, on Sundays and public holidays: 8.00 am to 6.00 pm.
dB	Noise is measured in units called decibels (dB).
DP&E	Department of Planning and Environment
EA	Environmental assessment
EMM	EMM Consulting Pty Limited
EP&A Act	*Environmental and Planning Assessment Act 1979* (NSW)
EPA	The NSW Environment Protection Authority (formerly the Department of Environment, Climate Change and Water).
Evening period	Monday–Saturday: 6.00 pm to 10.00 pm, on Sundays and public holidays
INP	Industrial Noise Policy
Intrusive noise criteria	The intrusive noise criteria refers to noise that intrudes above the background level by more than 5 dB. The intrusiveness criterion is described in detail in Section 3.1.
L_{A1}	The A-weighted noise level exceeded for 1% of the time.
L_{A10}	The A-weighted noise level which is exceeded 10% of the time. It is roughly equivalent to the average of maximum noise level.
L_{A90}	The A-weighted noise level that is exceeded 90% of the time. Commonly referred to as the background noise level.
L_{Aeq}	The A-weighted energy average noise level. This is the equivalent continuous sound pressure level over a given period. The $L_{Aeq(15\text{-}minute)}$ descriptor refers to an L_{Aeq} noise level measured over a 15 minute period.
Linear peak	The peak level of an event is normally measured using a microphone in the same manner as linear noise (i.e. unweighted), at frequencies both in and below the audible range.
L_{Amax}	The maximum A-weighted sound pressure level received during a measurement interval.
Night period	Monday–Saturday: 10.00 pm to 7.00 am, on Sundays and public holidays: 10.00 pm to 8.00 am.
NMP	Noise management plan

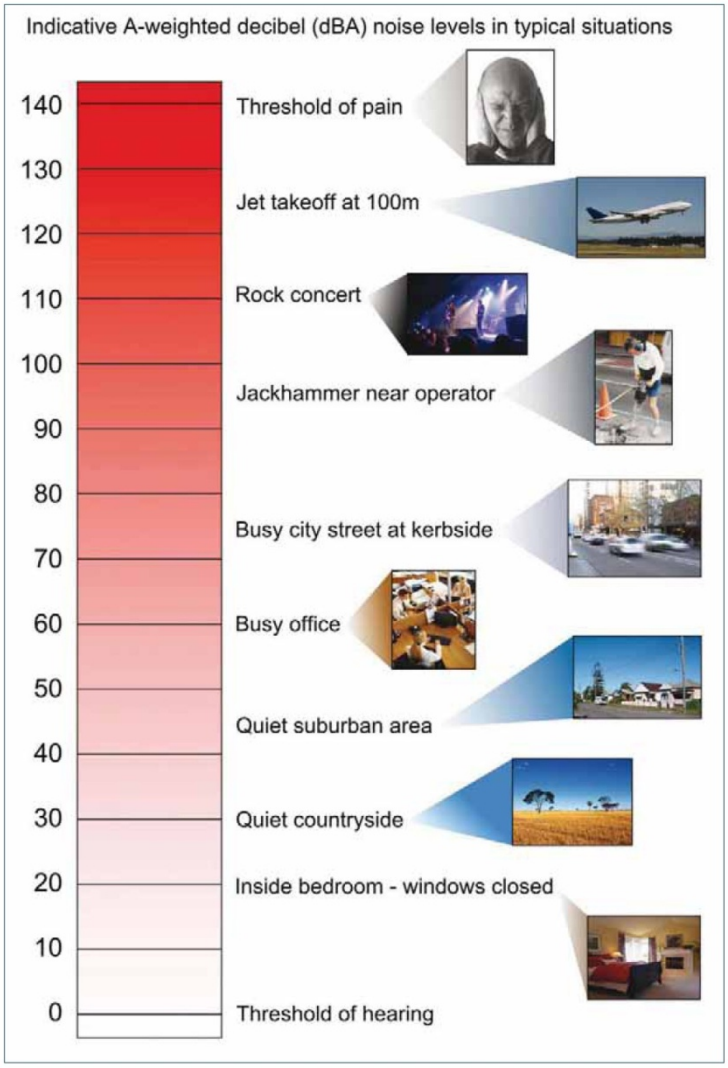
Table G.1 Glossary of acoustic terms and abbreviations

Abbreviation or term	
NPfI	Noise Policy for Industry
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
PNTL	Project noise trigger level
PSNL	The project-specific noise level (PSNL) is criteria for a particular industrial noise source or industry. The PSNL is the lower of either the intrusive noise criteria or amenity noise criteria.
RBL	The rating background level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the average background levels.
RNP	Road Noise Policy
Sound power level (L_w)	A measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.
Temperature inversion	A meteorological condition where the atmospheric temperature increases with altitude.

It is useful to have an appreciation of decibels (dB), the unit of noise measurement. Table G.2 gives an indication as to what an average person perceives about changes in noise levels. Examples of common noise levels are provided in Figure G.1.

Table G.2 Perceived change in noise

Change in sound level (dB)	Perceived change in noise
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud



Source: Road Noise Policy (Department of Environment, Climate Change and Water, 2011

Figure G.1 Common noise levels

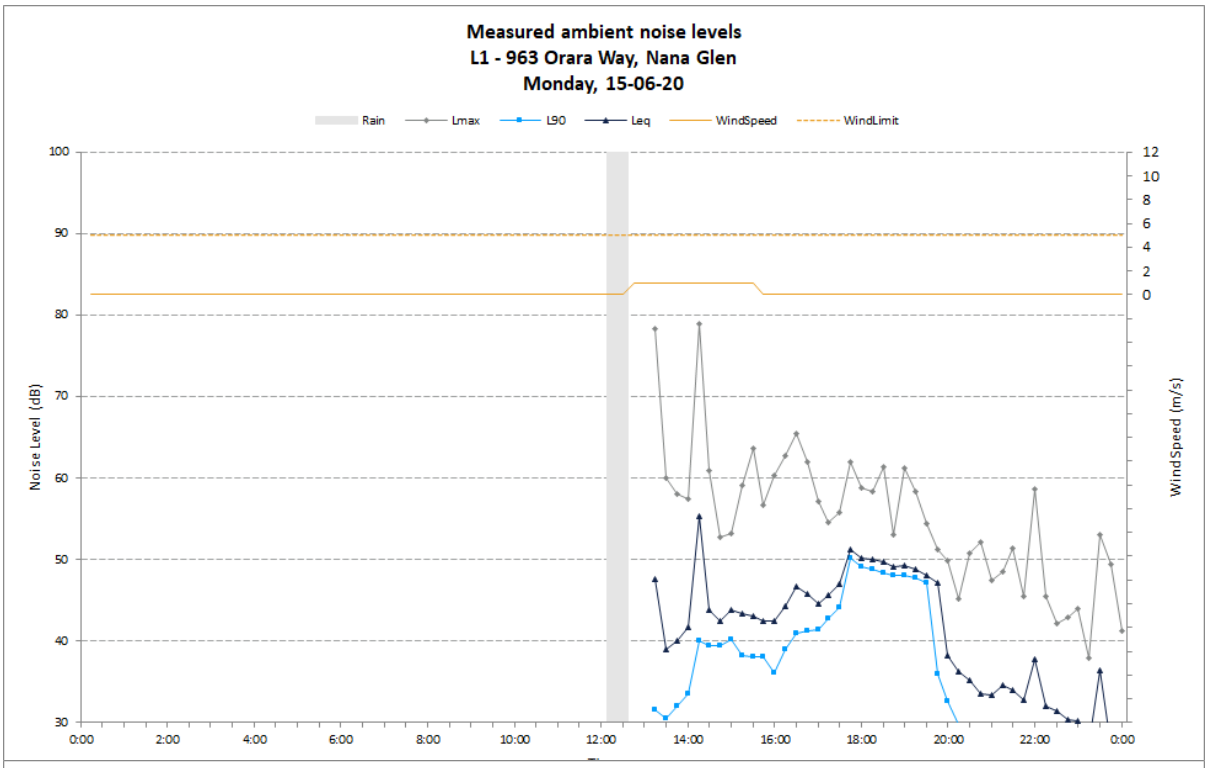
Appendix A

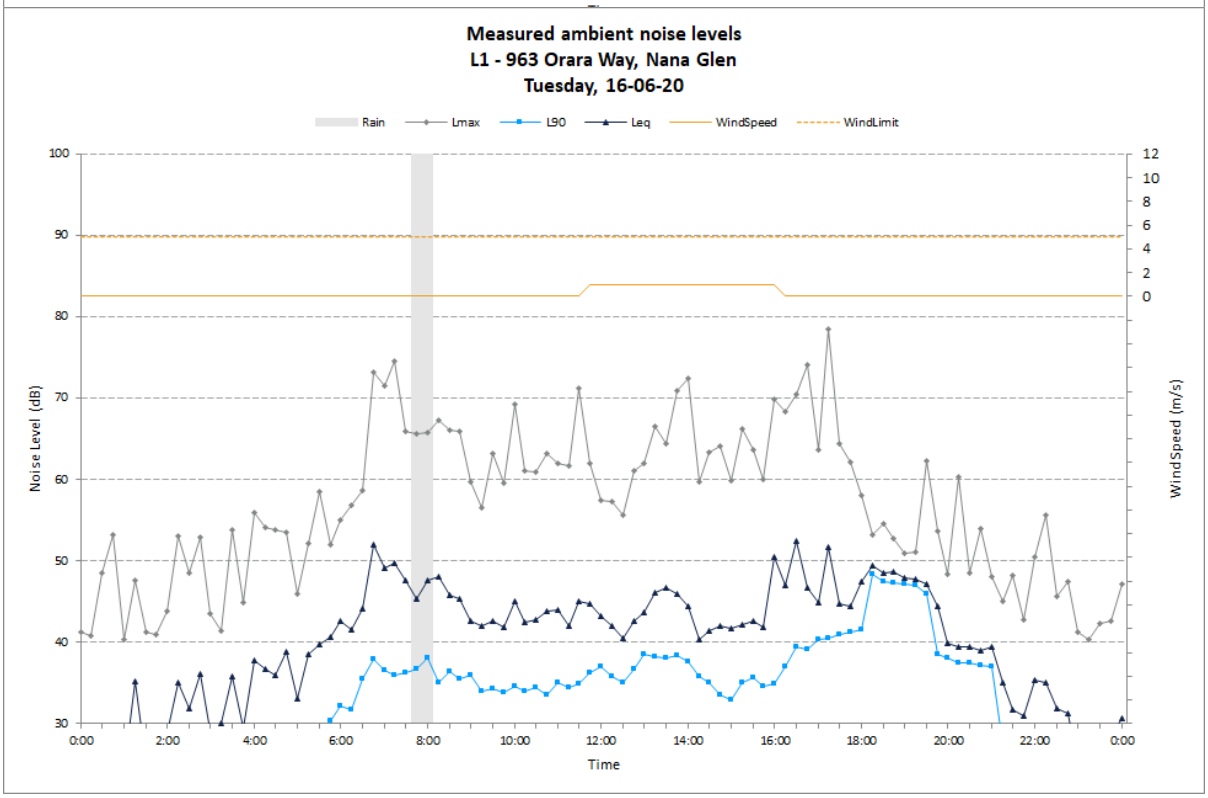
Unattended noise monitoring results and charts

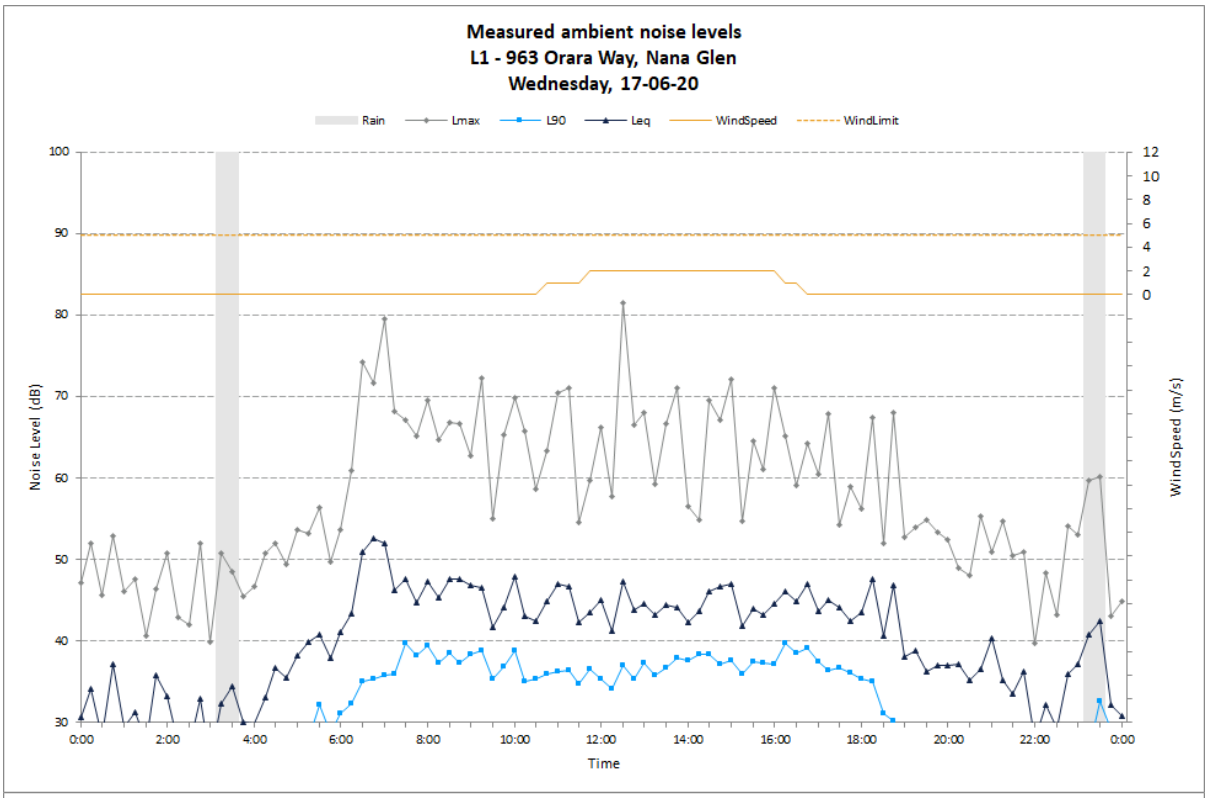
Table A.1 Summary of daily noise logging results – L1

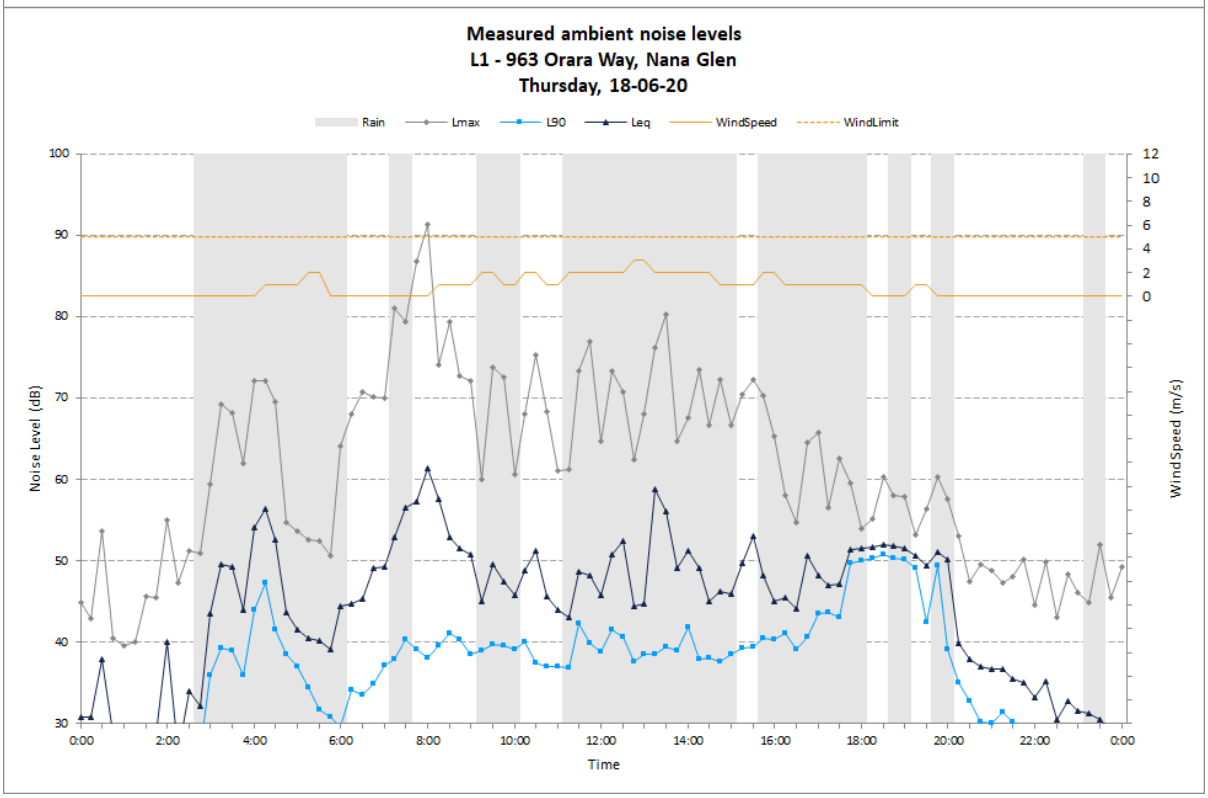
Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,15\ hour}$, dB (Day)	$L_{Aeq,4\ hour}$, dB (Evening)	$L_{Aeq,9\ hour}$, dB (Night)
Monday, 15-06-20	0	26	22	0	46	40
Tuesday, 16-06-20	34	26	22	46	45	42
Wednesday, 17-06-20	35	24	0	45	41	0
Thursday, 18-06-20	0	0	26	0	0	41
Friday, 19-06-20	34	29	24	48	46	39
Saturday, 20-06-20	34	26	23	48	42	38
Sunday, 21-06-20	36	39	24	49	48	39
Monday, 22-06-20	32	26	24	45	41	42
Tuesday, 23-06-20	32	23	23	45	39	40
Wednesday, 24-06-20	34	27	23	46	40	42
Thursday, 25-06-20	34	25	22	48	39	40
Friday, 26-06-20	35	26	24	45	40	39
Saturday, 27-06-20	35	25	22	48	38	37
Sunday, 28-06-20	34	25	22	47	38	40
Monday, 29-06-20	0	0	0	0	0	0
Overall	34	26	23	47	43	40

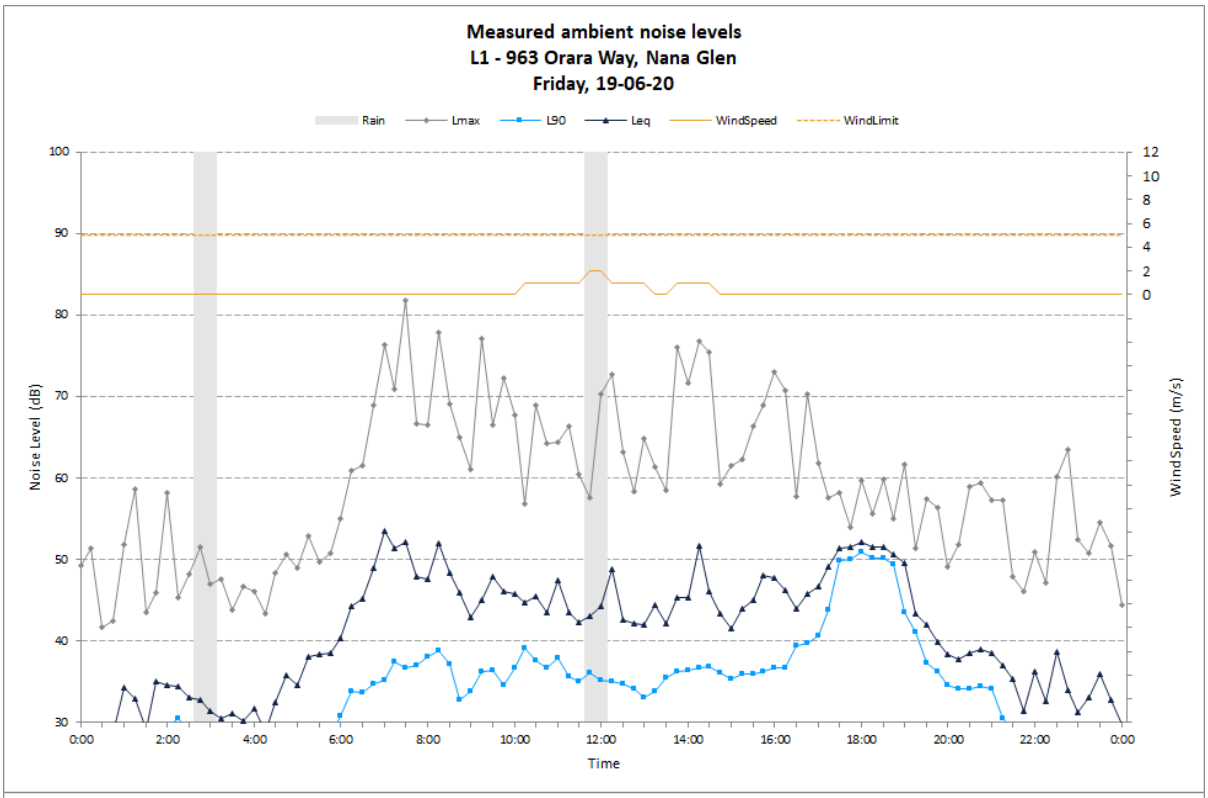
Notes: "0" indicates periods with too few valid samples due to weather or logger operation


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Monday, 15-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
100
90
80
70
60
50
40
30
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Tuesday, 16-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
100
90
80
70
60
50
40
30
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Wednesday, 17-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Thursday, 18-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Friday, 19-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
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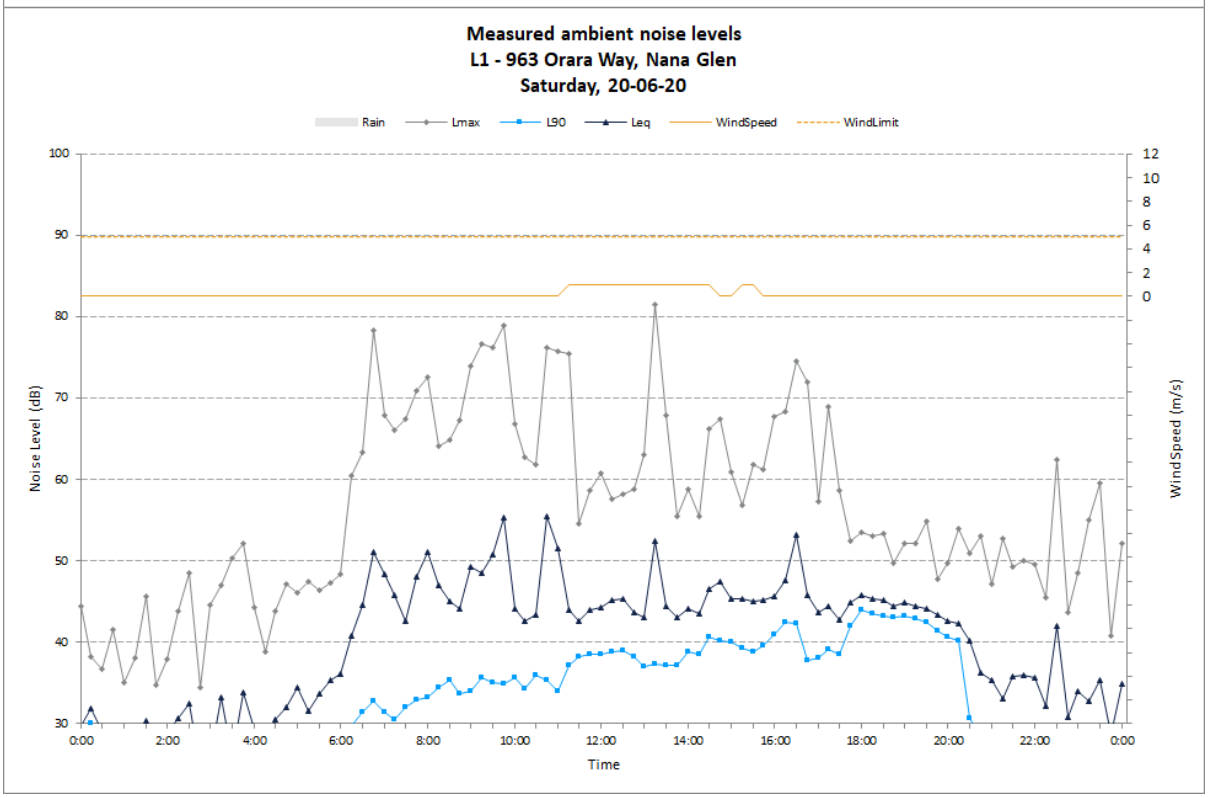
Measured ambient noise levels
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Saturday, 20-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
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6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
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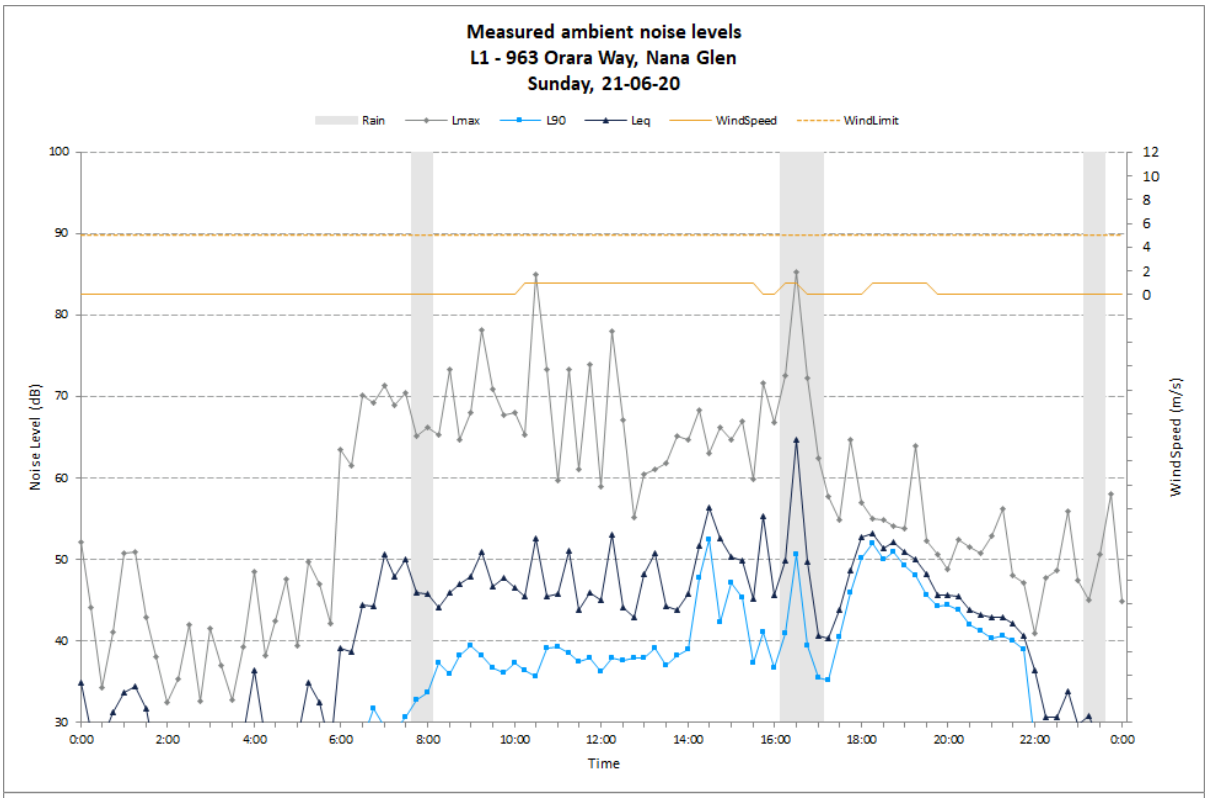
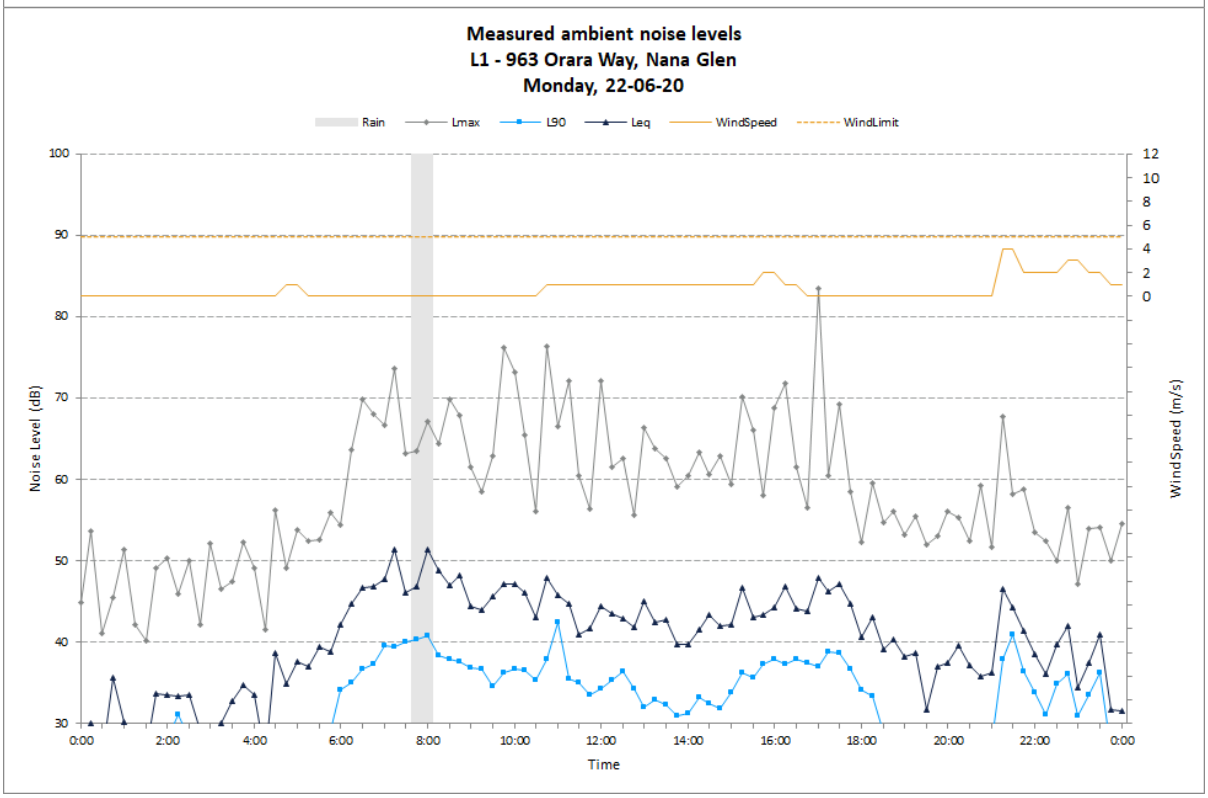
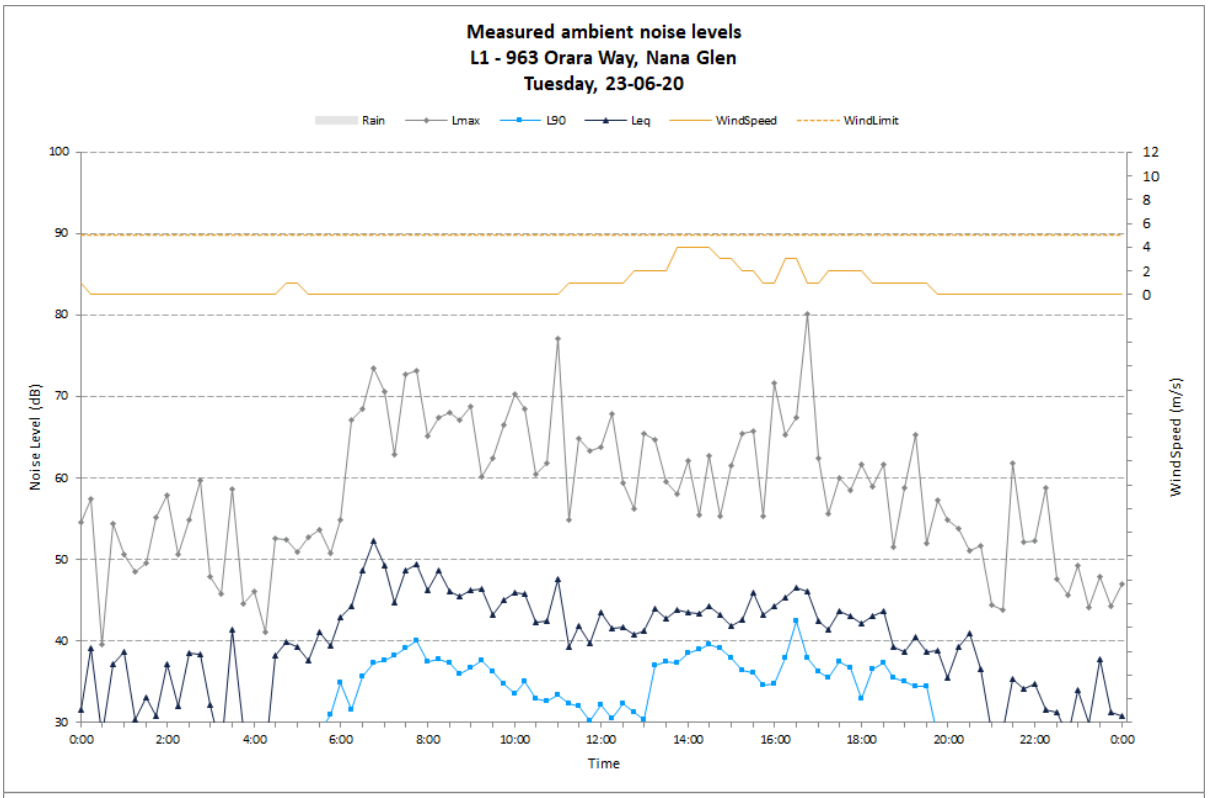

Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Sunday, 21-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Monday, 22-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Tuesday, 23-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
0:00
2:00
4:00
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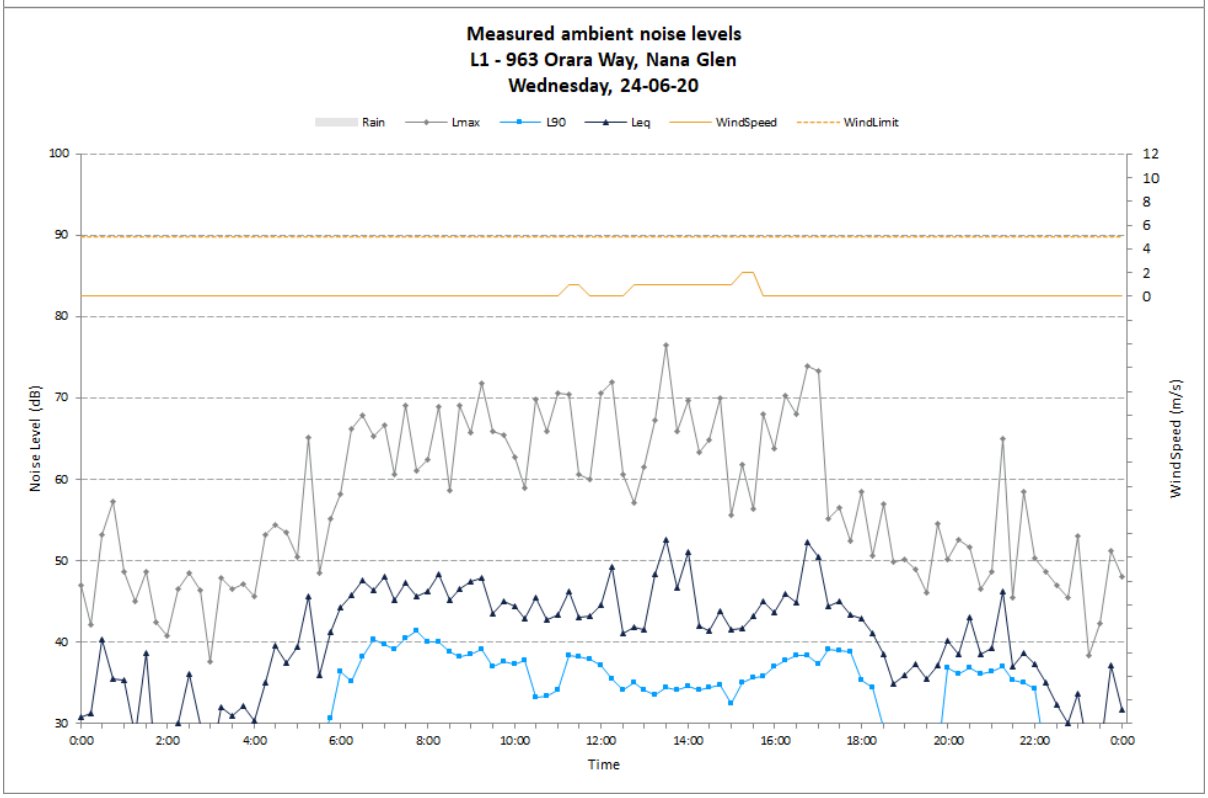
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Wednesday, 24-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
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4:00
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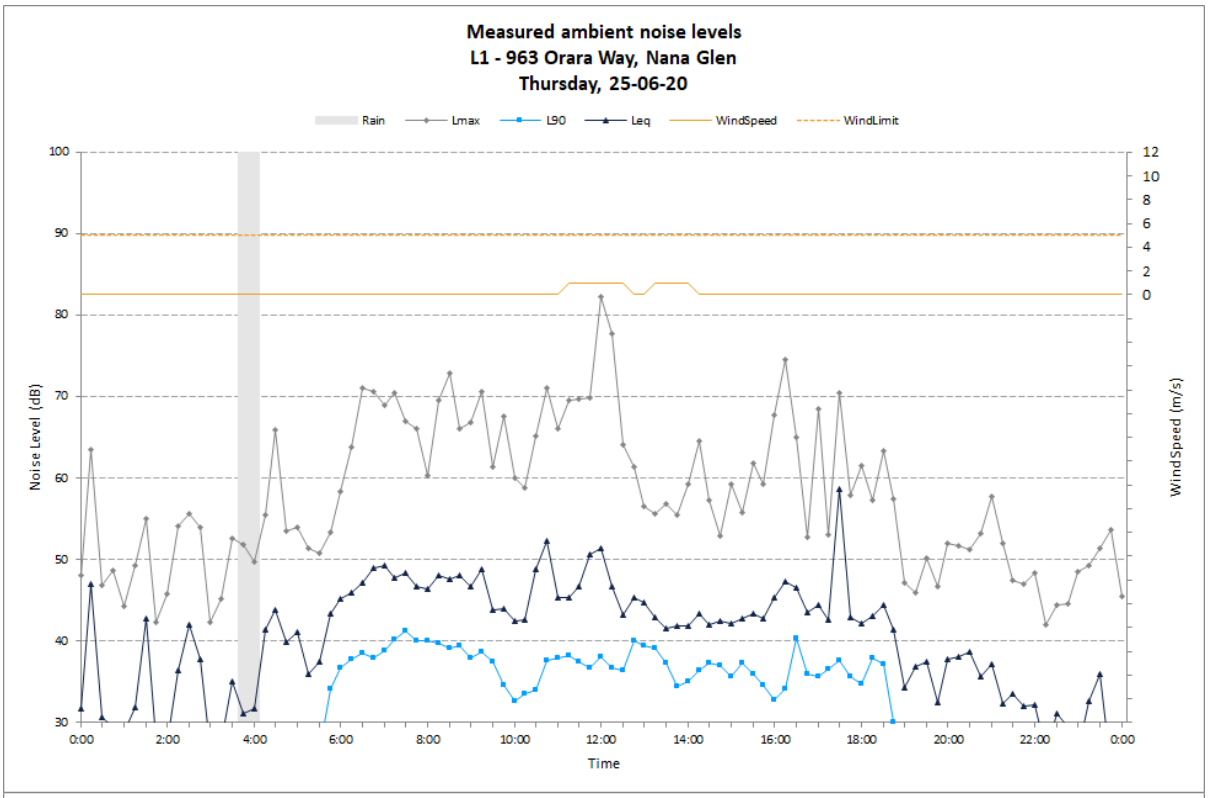
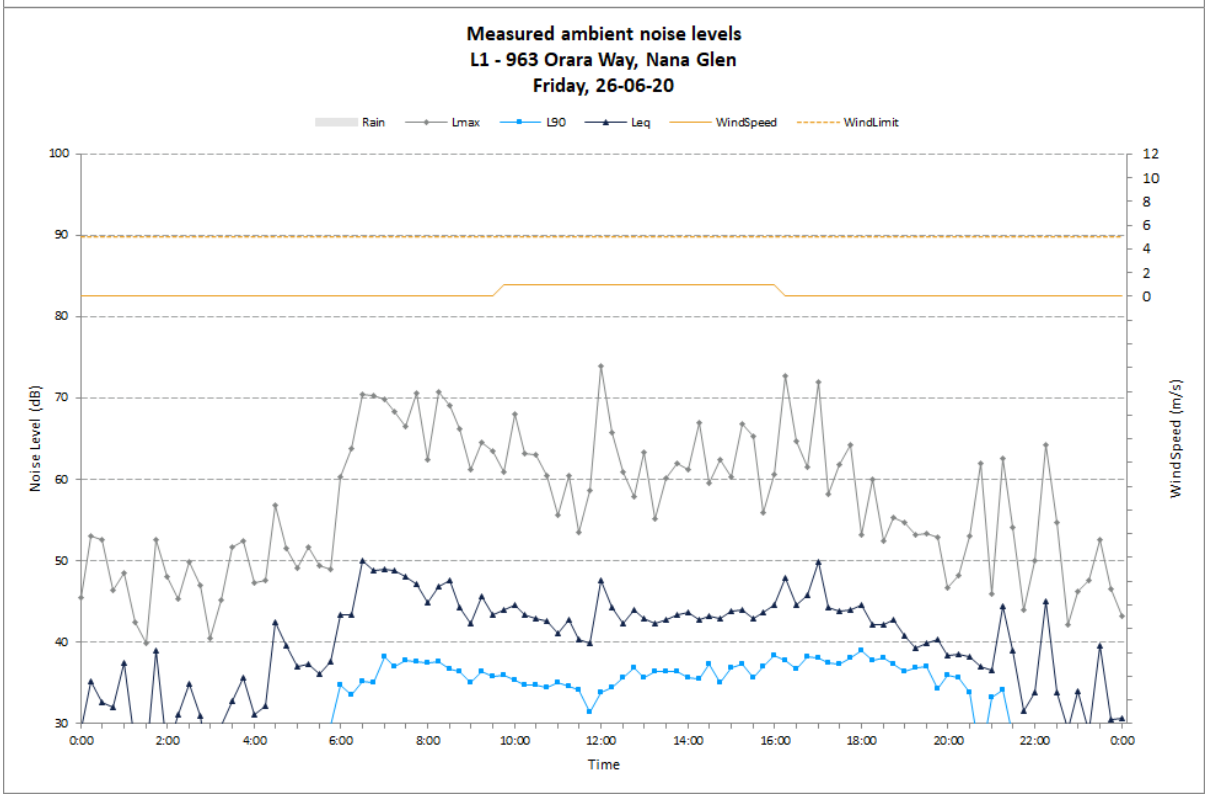
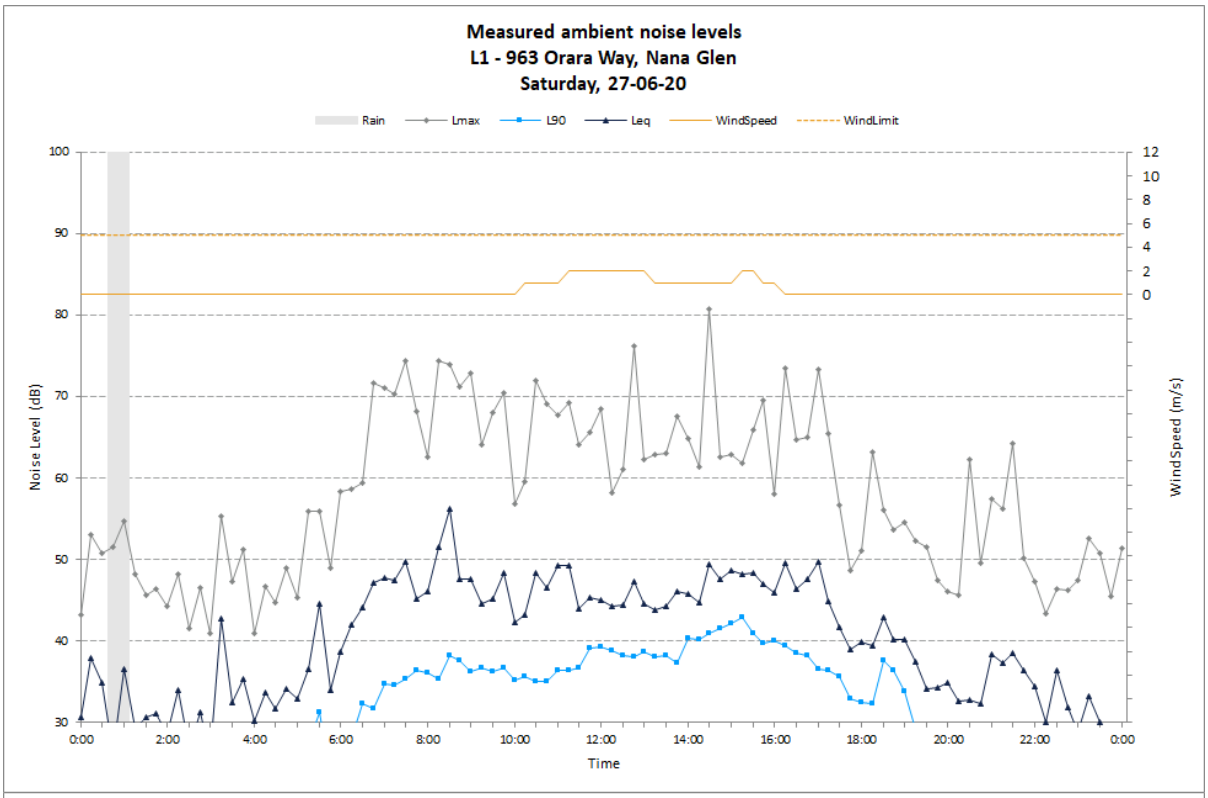
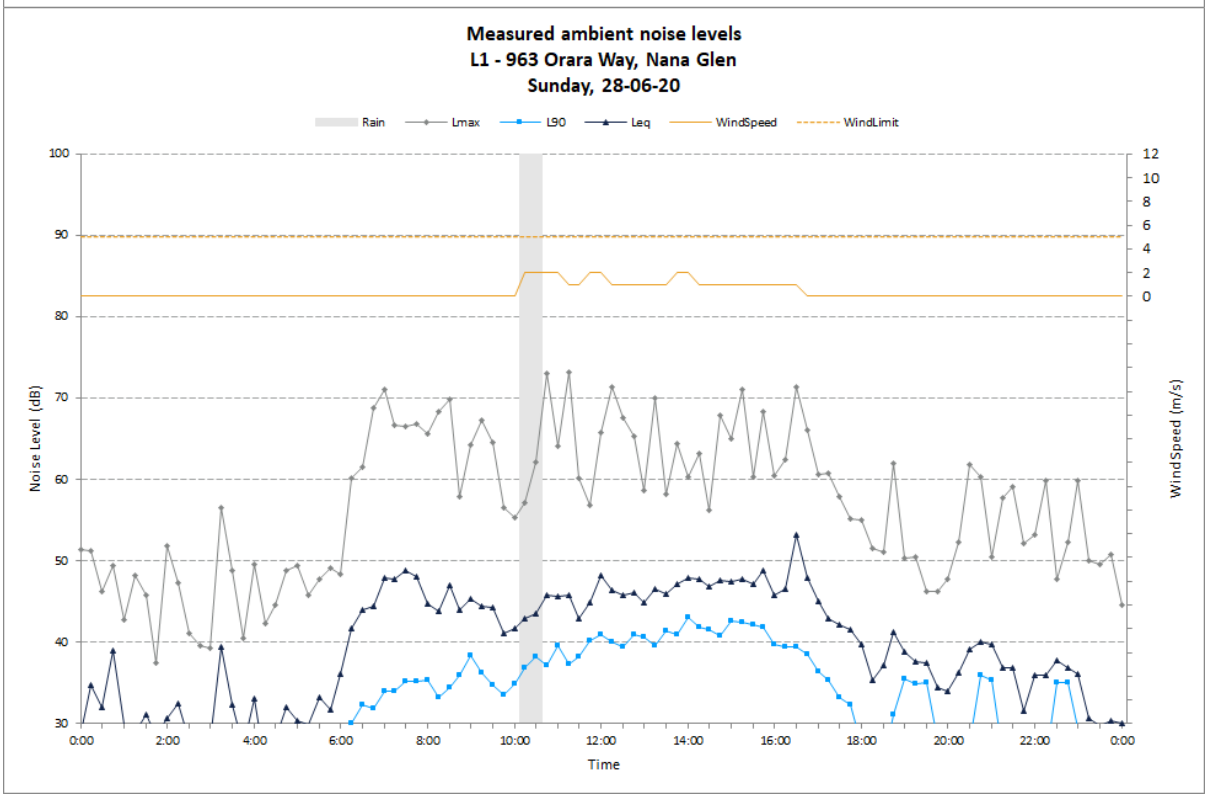
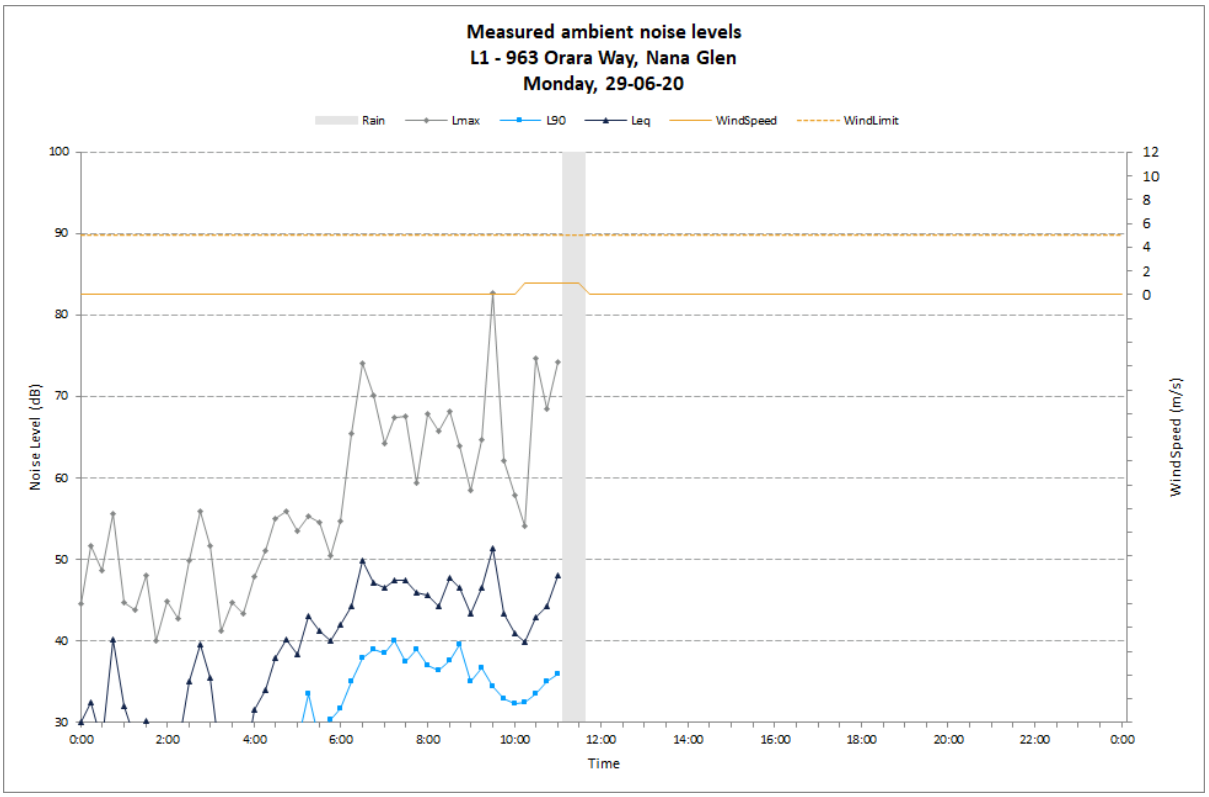
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Thursday, 25-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Friday, 26-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Saturday, 27-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Sunday, 28-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time


Measured ambient noise levels
L1 - 963 Orara Way, Nana Glen
Monday, 29-06-20
Rain
Lmax
L90
Leq
WindSpeed
WindLimit
Noise Level (dB)
WindSpeed (m/s)
Time
100
90
80
70
60
50
40
30
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Appendix B

Amended Plans

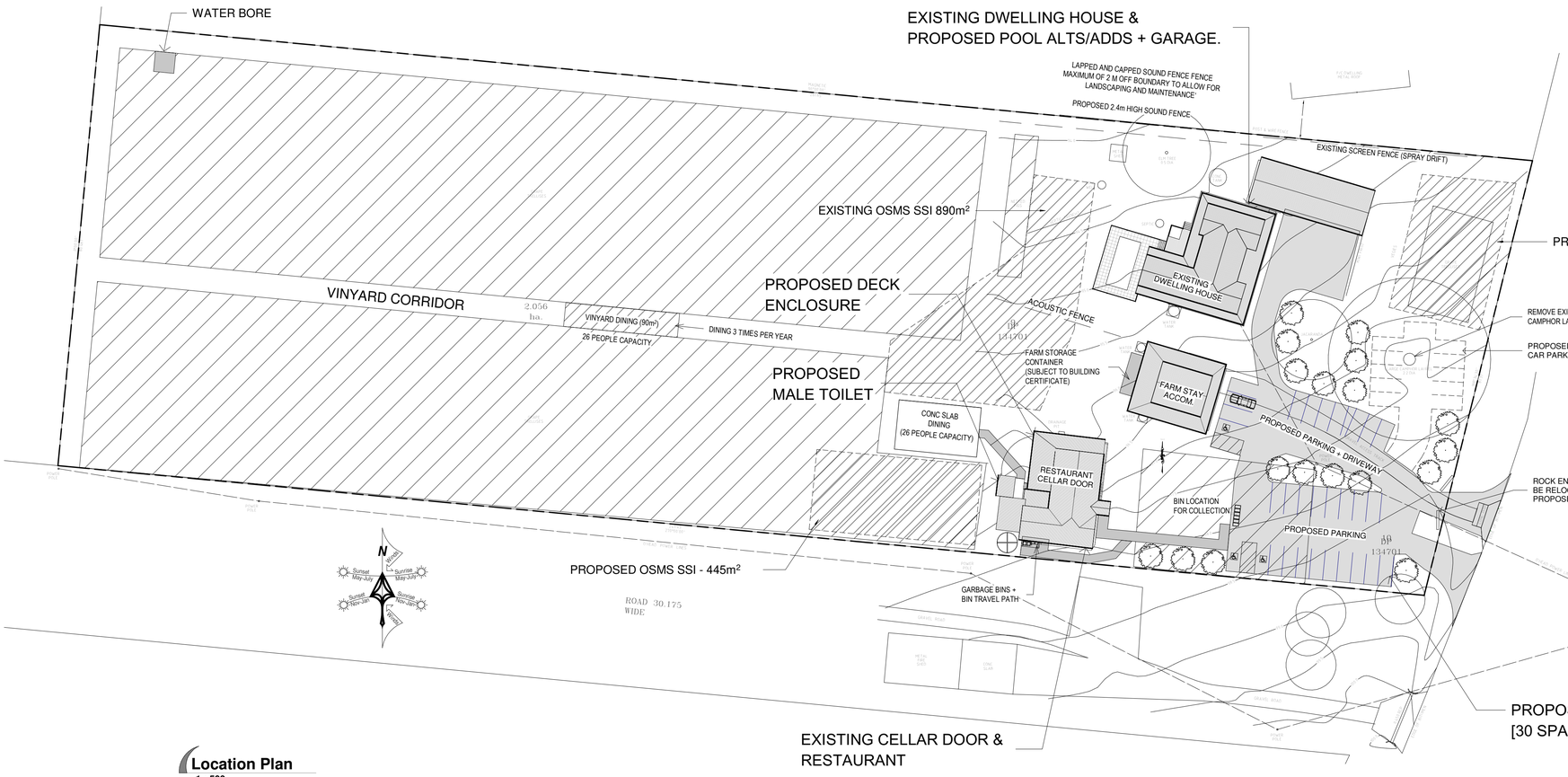
Cellar Door North

Proposed Alterations & Additions: Carpark and Male Toilet + Storage to Existing Cellar Door + Restaurant (Tourist Facility)

Two Tales Winery
963 Orara Way, Nana Glen NSW 2450
Lot 9 & 10 DP 134701

For: Madonna & Barry Bannerman

Drawing Schedule	
Sheet Number	**Sheet Name**
WD 01	Cover Sheet + Location Plan + Drawing Schedule
WD 02	Site Plan
WD 03	Cellar Door



Location Plan
1 : 500

SCHEDULE OF CHANGES:

- NOISE ATTENUATION SCREENS ADDED
- D'ABLE PARKING ON ROAD RESERVE RELOCATED
- ADDITIONAL MALE TOILET
- AMENDED ON-SITE PARKING & ENTRY
- ENCLOSED DECK
- CONCRETE SLAB AS DINING AREA
- DESCRIBE EXISTING DWELLING HOUSE
- DESCRIBE EXISTING SHED 'CHANGE OF USE' TO FARM STAY ACCOMMODATION.
- EXTEND NOISE ATTENUATION SCREEN TO LAWN AREA
- PAROPOSED CARPARK ACCESS PATH LEVELS INCLUDED
- CHANGES AS PER COUNCIL NOTES.
- BIN LOCATION AND PATH TO COLLECTION POINT.
- AMENDED PARKING AND OVERFLOW PARKING.
- WASTE WATER DISPOSAL AREAS.

Member Australian Institute of Architects
Andrew Wilson
nsw reg. No. 7906 qld reg. 5016

BUILDING DESIGNERS AUSTRALIA NSW
Tony Ross
membership No. 614-99

figured dimensions to be used in preference to scale - all dimensions to be checked on-site

No.	Description	Date
G	AS PER COUNCIL NOTES	01/12/2021
5	CONC. SLAB AS DINING AREA, EXTEND ATTENUATION SCREENS TO LAWN AREA, ACCESS PATH LEVELS, DESCRIBE DWELLING HOUSE & EXISTING SHED 'CHANGE OF USE' TO FARM STAY ACCOMMODATION.	03/08/2021

Amendments

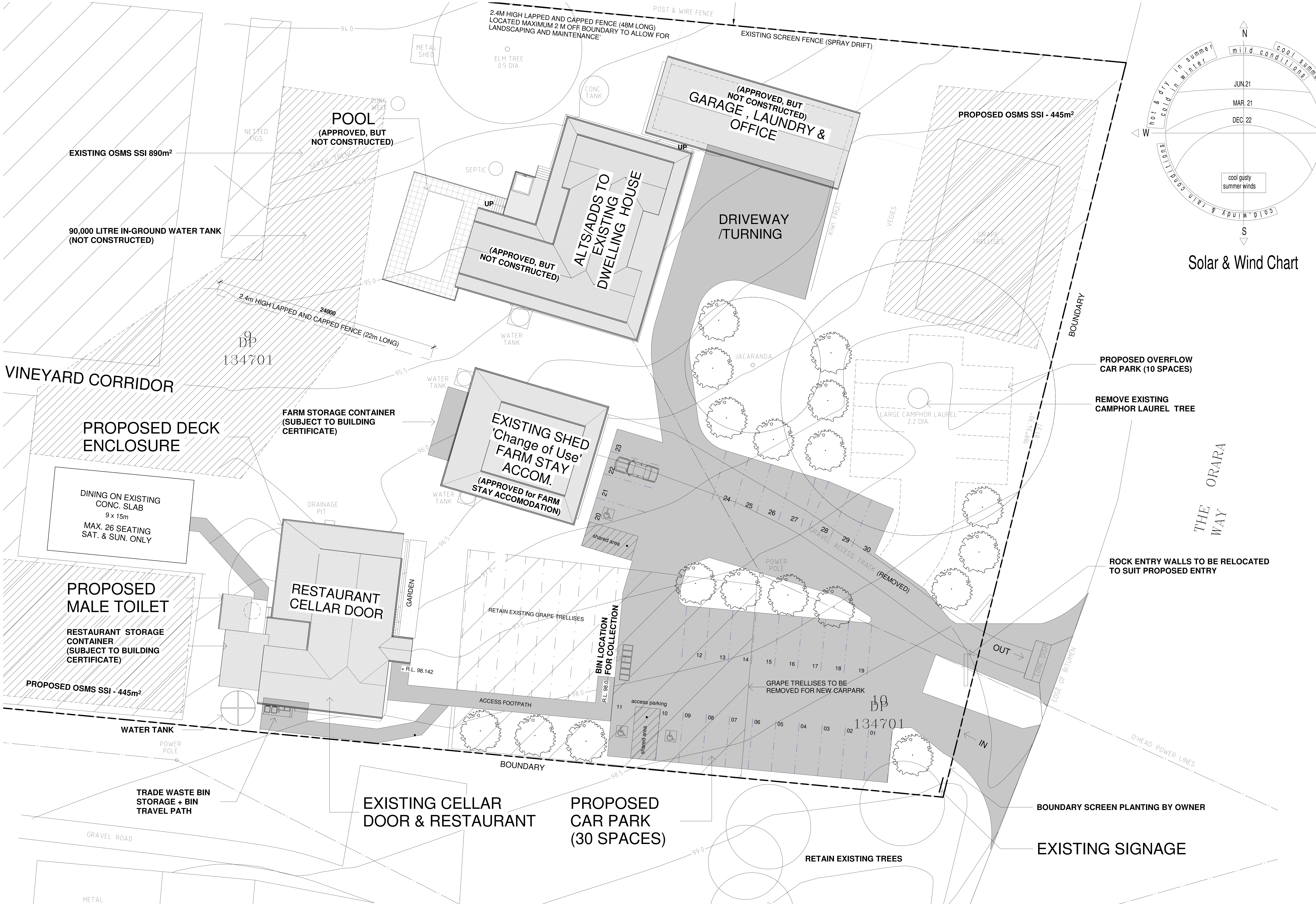
design studio 22
po box 969
coffs harbour 2450
t 6651 4104
f 6651 1880
info@designstudio22.com.au
www.designstudio22.com.au

Two Tails Winery

ALTERATIONS & ADDITIONS TO EXISTING
963 Orara Way, Nana Glen NSW 2450

Cover Sheet + Location Plan + Drawing Schedule

Project number	J0035	Drawing No.	**WD 01**
Date	12/08/18		
Drawn	Author		
Checked	Checker	Scale	1 : 500
Sheet No.		Sheet size	A1



note:

- locate existing services prior to construction
- erosion/sediment control in strict accordance with council requirements attached
- provide hardbase all weather access, during construction
- Driveway gradient in stict accordance with Council guidelines
- cut & fill to builder's discretion and engineers details
- All stormwater to existing stormwater service & to council requirements
- Builder to confirm all finished floor levels on site.

Site Proposed
1 : 200

DEMOLITION NOTES

1. BEFORE ANY WORKS COMMENCES THE CONTRACTOR IS TO TAKE SAMPLES OF EXISTING WALL CLADDINGS AND HAVE THEM TESTED FOR ASBESTOS.
2. ALL SERVICES AFFECTED BY DEMOLITION WORKS ARE TO BE MADE GOOD OR CAPPED OFF, AS REQUIRED, AND DETERMINED ON SITE.
3. WHEN WALLS & GLAZING ARE REMOVED FOR REPLACEMENT, PROVIDE SECURITY FROM UNAUTHORIZED ENTRY INTO THE BUILDING.
4. WHERE CONCRETE IS TO BE REMOVED FOR INSTALLATION OF SERVICE CONDUITS & WATER PIPEWORK UNDER EXISTING SLAB, NEATLY SAW CUT & REMOVE EXISTING SLAB AS REQUIRED REPLACE WITH NEW CONCRETE FINISH FLUSH WITH EXISTING FLOOR LEVEL AS DETAILED.
5. WHERE PORTIONS OF EXISTING EXTERNAL CONCRETE SLABS ARE TO BE DEMOLISHED, NEATLY SAW CUT AND REMOVE AS REQUIRED.
6. WHERE EXISTING FLOOR FINISHES ARE DEMOLISHED, REMOVE ALL GROUTS AND OR ADHESIVES, LEVEL FOOR AND PREPARE FOR NEW FLOOR FINISHES.
7. MAKE GOOD TO ALL SURFACES ADJACENT TO DEMOLITION AREAS.

GENERAL NOTES

CONFIRM ALL DIMENSIONS ON SITE PRIOR TO ORDER OF MATERIAL AND MANUFACTURE

KITCHEN, BATHROOM AND LAUNDRY FITOUT BY OTHERS

CO-ORDINATE WITH OWNER TO DETERMINE THE EXTENT OF NEW FLOOR FINISHES

KITCHEN CABINETS BY OTHERS

NEW EXTERNAL WALLS - 6mm CFC RENDER AND PAINT FINISHED ON STRUCTURAL STEEL STUD, WITH 10mm PLASTERBOARD INTERNALLY. INSTALL R1.0 BULK INSULATION IN STUD CAVITY. INCORPORATE REFLECTIVE INSULATION WITH AN EMITTANCE OF NOT MORE THAN 0.05 INWARDS BETWEEN CFC SHEETING AND STEEL STUD.
NEW INTERNAL WALLS
- 10mm PLASTERBOARD BOTH SIDES ON STEEL/TIMBER STUD
- 10mm PLASTERBOARD DIRECT STICK TO ALL EXISTING BRICK WALLS

INSTALL CORNICE AND SKIRTING TO MATCH EXISTING TO NEW WALLS

FIRE HAZARD PROPERTIES OF FLOOR MATERIALS AND FLOOR COVERINGS, AND WALL AND CEILING LINING MATERIALS SHALL COMPLY WITH BCA SPEC C1.10a

ALL GLAZING INCLUDING FRAMING AND FIXINGS TO MEET REQUIREMENTS OF AS 1288 AND AS 2047

ALL NEW MATERIALS AND CONSTRUCTION METHODS ARE TO BE IN ACCORDANCE WITH THE CURRENT N.T. DEEMED TO COMPLY, BUILDING CODES OF AUSTRALIA, SAA STANDARDS AND THE MANUFACTURER'S DIRECTION/SPECIFICATIONS

PAINT FINISH ALL EXPOSED STRUCTURAL STEEL & TIMBER.

VERANDAH ROOF COLORBOND TO MATCH EXISTING. PROVIDE COLORBOND FLASHING TO ALL EXPOSED EDGES

INSTALL AIR-CELL INSULBREAD 65 OR SIMILAR BELOW VERANDAH ROOFS

VERANDAH OVERHANGS TO MATCH EXISTING UNLESS OTHERWISE NOTED

ALL NEW DRIVEWAY AND PARKING HARD SURFACED AREAS TO BE DIRECTED AND DRAINED TO LAWN AND GARDENS.

ALL PROPOSED NEW STORWATER ROOF DRAINAGE TO NEW IN-GROUND 90,000LT WATER TANK.

GENERAL NOTES
1 : 1

Member Australian Institute of Architects
Andrew Wilson
nsw reg. No. 7906 qld reg. 5016

BUILDING DESIGNERS AUSTRALIA
Tony Ross
membership No. 614-99

figured dimensions to be used in preference to scale - all dimensions to be checked on-site

No.	Description	Date
4	AS PER COUNCIL NOTES	01/12/2021
3	CONC. SLAB AS DINING AREA, EXTEND ATTENUATION SCREENS TO LAWN AREA, ACCESS PATH LEVELS, DESCRIBE DWELLING HOUSE & EXISTING SHED 'CHANGE OF USE' TO FARM STAY ACCOMMODATION.	03/08/2021

Amendments

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design studio 22

Two Tails Winery

ALTERATIONS & ADDITIONS TO EXISTING
963 Orara Way, Nana Glen NSW 2450

Site Plan

Project number	J0035	Drawing No.	WD 02
Date	12/08/18		
Drawn	R.W.		
Checked	T.R.	Scale	As indicated
Sheet No.		Sheet size	A1

SPECIFICATION NOTES:

ALL WORK SHALL COMPLY WITH AUSTRALIAN STANDARDS INCLUDING:
with the NCC (National Construction Code)
including BCA (Building Code of Australia)

SITE DRAINAGE:
STORMWATER DRAINAGE IS TO BE IN ACCORDANCE WITH AS 3500.3 OR AS 3500.5.

MASONRY:
MASONRY IS TO COMPLY WITH EITHER AS 3700 OR AS 4773, PARTS 1AND 2.

CONCRETE:
RESIDENTIAL SLABS & FOOTINGS TO COMPLY WITH AS2870.
CONCRETE STRUCTURES TO COMPLY WITH AS3600
DAMP PROOF COURSES AND FLASHINGS TO COMPLY WITH AS2904.

TIMBER FRAMING:
ALL TIMBER STRUCTURES & FRAMING TO COMPLY WITH AS 1684 & AS1720.

ROOF/GUTTERING:
DESIGN & INSTALLATION OF SHEET ROOF CLADDING TO BE REFERENCED TO COMPLY WITH AS1562.
ROOF GUTTERING AND DOWNPIPES TO BE REFERENCED TO COMPLY WITH AS 3500.3 OR AS3500.5.

WIND LOADS:
WIND LOADS FOR HOUSING TO COMPLY WITH AS4055.

GLAZING:
WINDOWS IN BUILDINGS & GLAZING TO COMPLY WITH AS 1288 AND AS 2047.
SAFETY GLASS TO COMPLY WITH AS/NZS2208.

FIRE HAZARD PROPERTIES:
ROOF SARKING HAS A FLAMMABILITY INDEX OF NOT GREATER THAN 5.

SMOKE ALARMS:
SMOKE DETECTORS TO COMPLY WITH NCC CLAUSE 3.7.2.3 AND AS3786.

WET AREAS:
WATERPROOFING IN WET AREAS TO COMPLY WITH AS 3740 AND NCC TABLE 3.8.1.1.
WATERPROOFING OF DOMESTIC WET AREAS TO COMPLY WITH AS3740.

COLD WATER SERVICES:
COLD WATER SERVICES ARE TO BE IN ACCORDANCE WITH AS 3500.1 – 2003.

SANITARY PLUMBING AND DRAINAGE:
SANITARY PLUMBING IS TO BE IN ACCORDANCE WITH AS3500 OR AS3500.5

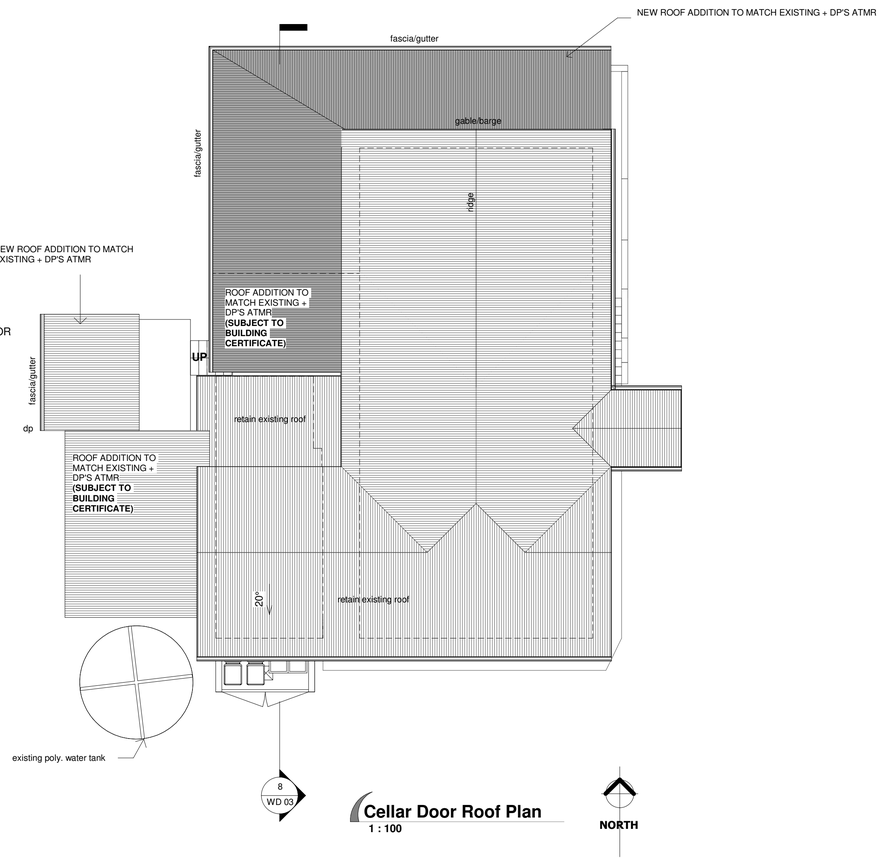
TERMITE MANAGEMENT:
TERMITE MANAGEMENT TO COMPLY WITH AS3660

BUSHFIRE :
BUSHFIRE CONSTRUCTION TO COMPLY WITH AS3959 (BAL 19)

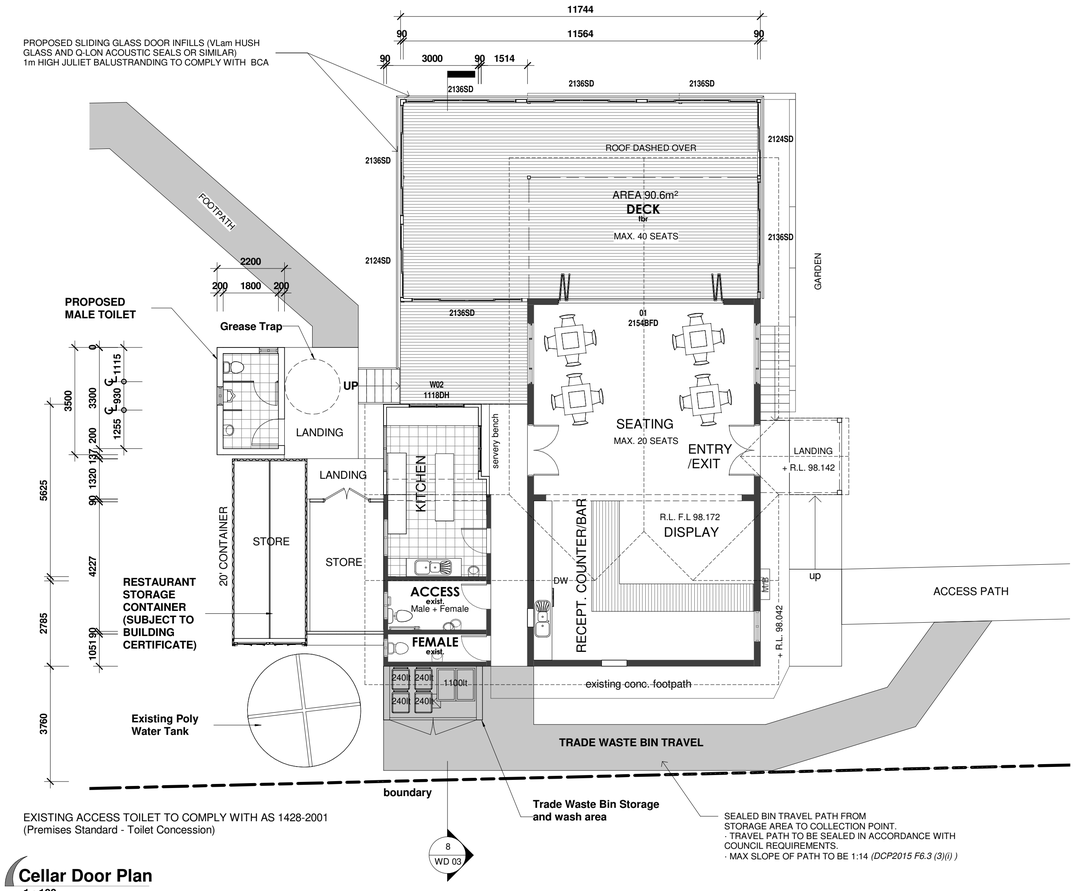
GAS BOTTLES/POINT TO:
AS1596, AS2658, AS4332, AS56016. Gas bottles/points to AS1596, AS2658, AS4332, AS5601

ACCESS AND DISABILITY:
IN ACCORDANCE WITH AS 1428.1-2009

FIRE FIGHTING EQUIPMENT:
TO COMPLY WITH SECTION E OF THE BCA.



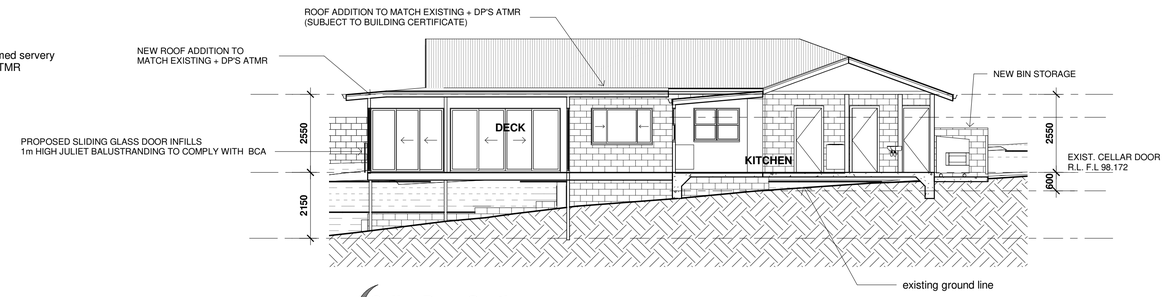
Cellar Door Roof Plan
1 : 100



Cellar Door Plan
1 : 100

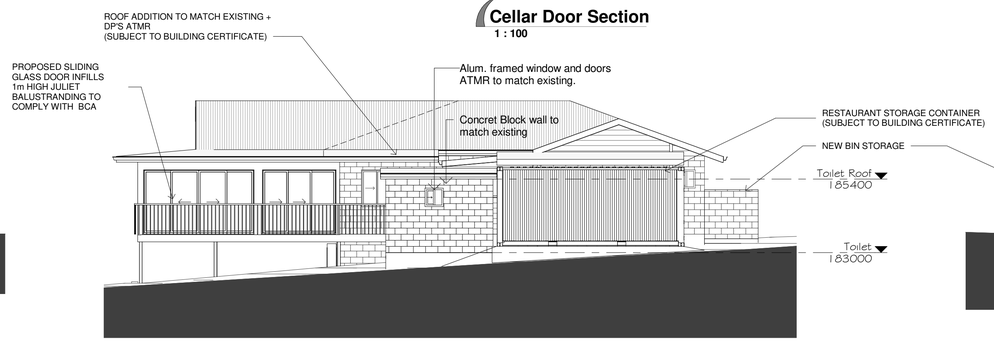
SPECIFICATION NOTES
1 : 1

Cellar Door North Elevation
1 : 100



Cellar Door Section
1 : 100

Cellar Door South Elevation
1 : 100



Cellar Door West Elevation
1 : 100

Cellar Door East Elevation
1 : 100

Member Australian Institute of Architects
Andrew Wilson
nsw reg. No. 7906 qld reg. 5016
BUILDING DESIGNERS AUSTRALIA NSW
Tony Ross
membership No. 614-99

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No.	Description	Date
5	AS PER COUNCIL NOTES	01/12/2021
4	CONC. SLAB AS DINING AREA, EXTEND ATTENUATION SCREENS TO LAWN AREA, ACCESS PATH LEVELS, DESCRIBE DWELLING HOUSE & EXISTING SHED 'CHANGE OF USE' TO FARM STAY ACCOMMODATION.	03/08/2021

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ALTERATIONS & ADDITIONS TO EXISTING
963 Orara Way, Nana Glen NSW 2450

Cellar Door

Project number	J0035	Drawing No.	WD 03
Date	12/08/18		
Drawn	Author		
bYhecked	Checker		
Sheet No.		Scale	As indicated
		Sheet size	A1

Appendix C

Noise modelling input calculations

Reverberation time and Rindel calculation

Space	Dimensions of room Length	Width	Height	Volume	NRC values Ceiling NR	Floor NI	Panel NI	Open ba	Wall NR	Absorption sabins Ceiling A	Floor A	Panel AI	Open do	Wall Ab	Reverb Predictio	Open doors Doors area	Extra panel Panel size	Rindel Calculation Rt	Volume	Seats	Aroom	Apeopl	Atotal	Group	Lea	Vocal effort based on Rindel LSA1m	Lw
Deck	9	10	2.4	216	0.1	0.1	0.7	1	0.1	9	9	63	67.2	9.12	0.22	67.20	90.00	0.22	216	40	**156**	8	164	3	71	68	76
Restaurant	8	10	2.5	200	0.1	0.1	0.7	1	0.1	8	8	0	11	9	0.89	11.34	0.00	0.89	200	20	**36**	4	40	3	77	71	79
Deck enclosed (Evening)	9	10	2.4	216	0.1	0.1	0.7	1	0.1	9	9	63	0	9.12	0.39	0.00	90.00	0.39	216	40	**90**	8	98	3	76	70	78
Deck + Lawn North enclosed	9	10	2.4	216	0.1	0.1	0.7	1	0.1	9	9	63	33.6	9.12	0.28	33.60	90.00	0.28	216	40	**123**	8	131	3	73	69	77

Rindel calculation – Restaurant and deck noise

		Linear, dB								A-wt	Lin
Daytime - No Lawn		**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		
Deck	**Vocal SPL (Rindel Method) + 3dB to L10**	59.7	63.5	70.2	73.1	69.4	64.8	59.8	53.6	74.0	76.7
All open	**Music SPL L10**	70.0	74.3	66.3	70.6	64.3	57.8	54.6	49.3	70.3	77.5
90m2 NRC 0.7 Absorption	**Total SPL L10**	70.4	74.6	71.6	75.0	70.5	65.6	60.9	54.9	75.5	80.1
Inside	**Vocal SPL (Rindel Method) + 3dB to L10**	65.7	69.5	76.2	79.1	75.4	70.8	65.8	59.6	80.0	82.7
	Music SPL L10	70.0	74.3	66.3	70.6	64.3	57.8	54.6	49.3	70.3	77.5
	Total SPL L10	71.4	75.5	76.6	79.6	75.7	71.0	66.1	59.9	80.4	83.8
Applying to model	**For daytime**	**Use the log sum deck noise with -6 reverb correction per m**									
Evening - All closed											
Deck	**Vocal SPL (Rindel Method) + 3dB to L10**	64.7	68.5	75.2	78.1	74.4	69.8	64.8	58.6	79.0	81.7
All closed	**Music SPL L10**	70.0	74.3	66.3	70.6	64.3	57.8	54.6	49.3	70.3	77.5
90m2 NRC 0.7 Absorption	**Total SPL L10**	71.1	75.3	75.7	78.8	74.8	70.0	65.2	59.0	79.5	83.1
Inside	**Vocal SPL (Rindel Method) + 3dB to L10**	65.7	69.5	76.2	79.1	75.4	70.8	65.8	59.6	80.0	82.7
	Music SPL L10	70.0	74.3	66.3	70.6	64.3	57.8	54.6	49.3	70.3	77.5
	Total SPL L10	71.4	75.5	76.6	79.6	75.7	71.0	66.1	59.9	80.4	83.8
Applying to model	**For balcony glazing: apply -6 reverb per m and TL**										
	Glazing TL 6.38mm glazing	19.0	22.0	24.0	30.0	36.0	33.0	38.0	42.0		

Rindel calculation – Restaurant and deck noise with north side closed (when Lawn is in use)

		Linear, dB								A-wt	Lin
Daytime - Lawn		63	125	250	500	1000	2000	4000	8000		
Deck	Vocal SPL (Rindel Method) + 3dB to L10	61.7	65.5	72.2	75.1	71.4	66.8	61.8	55.6	76.0	78.7
North closed.	Music SPL L10	70.0	74.3	66.3	70.6	64.3	57.8	54.6	49.3	70.3	77.5
90m2 NRC 0.7 Absorption	Total SPL L10	70.6	74.8	73.2	76.4	72.1	67.3	62.5	56.5	77.0	81.1
Inside	Vocal SPL (Rindel Method) + 3dB to L10	65.66	69.5	76.2	79.1	75.4	70.8	65.8	59.6	80.0	82.7
	Music SPL L10	70.0	74.3	66.3	70.6	64.3	57.8	54.6	49.3	70.3	77.5
	Total SPL L10	71.4	75.5	76.6	79.6	75.7	71.0	66.1	59.9	80.4	83.8
Applying to model	For daytime	Use the log sum deck noise with -6 reverb correction per m