EXIBITION DRAFT

Acoustic Report

Gap Bluff Precinct
Cliff Road, Watson Bay, NSW

Project 215 043

June 2015

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Prepared For
Gap Bluff Hospitality Pty Ltd

Mr Philip Beauchamp

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Author: **Jimmy Ameli**

Checked / Revised: **Simon Connolly**

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Prepared By
Peter R Knowland & Associates Pty Ltd
t/a PKA Acoustic Consulting
PO Box 345, Lane Cove, NSW, 1595
Suite 12, 401 Pacific Highway
ARTARMON, NSW, 2064
ABN 73 001 594 583, ACN 001 594 583
Telephone: (02) 9460 6824, Facsimile: (02) 9460 6823, Email: admin@pka.com.au

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1 INTRODUCTION

The Gap Bluff Precinct comprises a number of Historic Buildings in the Watson's Bay area of Sydney's Eastern Suburbs in publically accessible parkland. Until recently, some of properties were operated by National Parks for function hire.

Gap Bluff Hospitality Pty Ltd (GBH) have entered into a Heads of Agreement with National Parks, a division of the Department of Environment and Heritage for the development and in the most part, continued use of the six properties.

The continued use will see GBH providing substantial refurbishment and in some cases, alterations to the existing properties

National Parks have requested that GBH provide a Review of Environmental Factors (REF) to accompany the continued use. In particular National Parks have advised that previous operations attracted noise complaints regarding music and departing patrons.

PKA Acoustic Consulting have been commissioned by Gap Bluff Hospitality Pty Ltd to conduct an acoustic assessment of the proposed facilities at Gap Bluff Precinct, Cliff Street, Watson Bay to determine the likely noise impact on the surrounding environment. The acoustic report will be part of REF documentation to be submitted to National Parks.

The proposal includes noise control measures such as operable and fixed screens and roofs, and in some cases acoustic rated building elements.

The acoustic report includes the proposed noise control measures in the assessment and these will be included as part of the detailed design process.

The assessments in this report are based on:

- Detail Concept Drawing prepared by JPW Architects
- Traffic Impact Assessment Report prepared by Ason Group
- Site inspections and acoustic surveys carried out by PKA Acoustic Consulting
- Usage data provided by GAP Hospitality Pty Ltd

2 SUMMARY

PKA Acoustic Consulting have been commissioned by Gap Hospitality Pty Ltd to conduct an acoustic assessment of the proposed facilities at Gap Bluff Precinct, Cliff Street, Watson Bay to review the likely noise impact on the surrounding environment.

Noise monitoring was conducted on site to establish the ambient noise levels. In addition attended noise measurements were conducted on various points to establish the criteria. Based on the results of noise monitoring and night time ambient measurements, typical noise criteria provided by the Council Development Control Plan, Environment Protection Authority Industrial Noise Policy and Road Noise Policy and the Office of Liquor Gaming and Racing licensed premises criteria were determined.

An assessment of the likely noise generated from the buildings and the patrons has been carried out. The assessment has concluded:

- Noise Emissions from the proposed Constables Cottage Café can comply with the noise limits in the Woollahra Council Development Control Plan (DCP) and the Office of Liquor Gaming and Racing (OLGR) based on the noise control screens and roof shown indicatively on the architectural drawings. The windows to the cottage will be closed to limit noise spill from the internal dining spaces. These will be subject to further detailed acoustic design. Other operating commitments are included in this report.

- Noise levels due to the operation of the short stay accommodation at 33 Cliff Street are unlikely to vary greatly from its current residential use. The use of the new terrace may lead to some additional noise. Offensive noise would however be governed by the sanctions and penalties in the Holiday and Short Term Rental Code of Conduct.

- Noise Emissions from the proposed Armoury Building Redevelopment can comply with the noise limits in the Woollahra Council DCP and the Office of Liquor Gaming and Racing (OLGR) based on the building construction and the noise control screens shown indicatively on the architectural drawings. These will be subject to further detailed acoustic design. Other operating commitments are included in this report.

- Noise Emissions from the proposed Officers Mess Redevelopment can comply with the noise limits in the Woollahra Council DCP and the Office of Liquor Gaming and Racing (OLGR) as the windows and doors will be closed. Other operating commitments are included in this report. The use of the outdoor areas around the officers mess building will only be during the daytime hours.

- The use of carpark will generate some noise impact although this will depend on the use of private vehicles. Noise level impacts can be reduced by the use of shuttle bus services and adequate supervision.

3 SITE DESCRIPTION

The main part of the precinct is located in a mixed use residential-commercial zone.
The main site is bound by Cliff Street to the west, residential land on the north and part of the east, the sea on the east and south sides. The site location is presented in Figure 1.

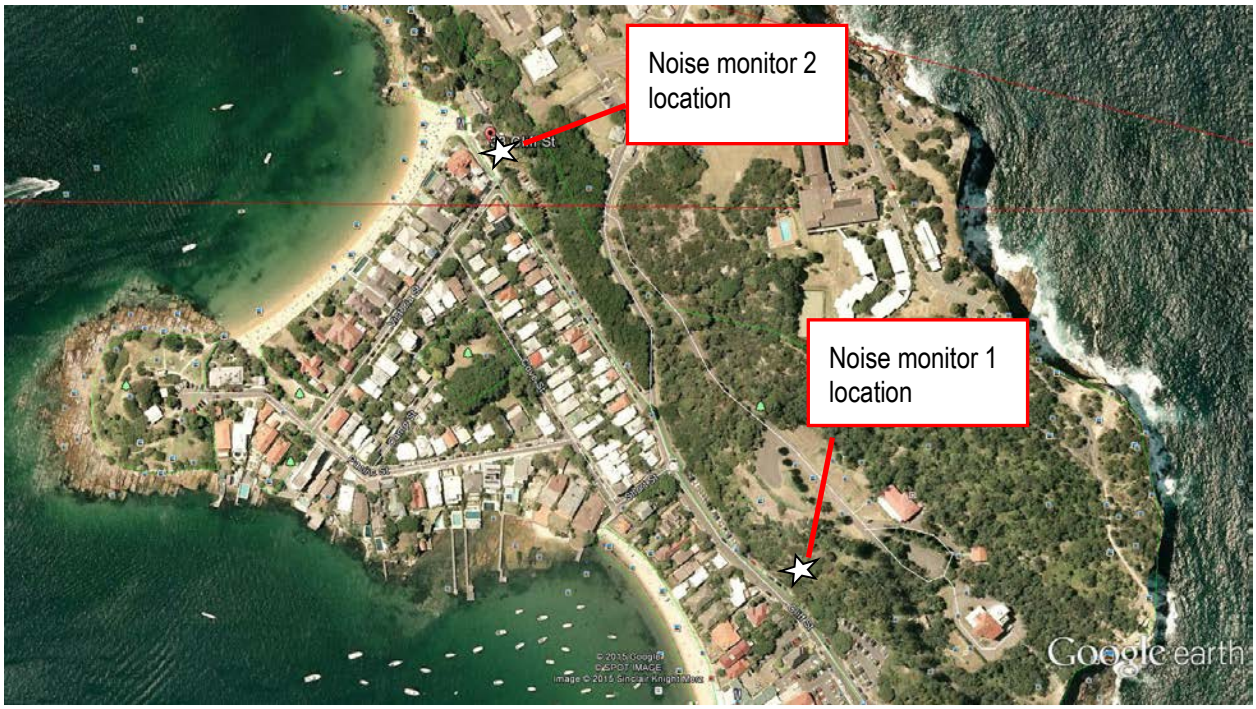


Figure 1 Site and noise monitor locations

3.1 Development Description

The development involve the refurbishment of existing historic buildings within the Gap Bluff Precinct and Camp Cove Precinct. The refurbished premises will be used for functions such as café / dining (in the case of the Constable's Cottage) and weddings and corporate events (Armoury and Officers Mess).

On site short stay accommodation will be provided in the refurbished Gap Bluff Cottage, 33 Cliff Street and Green Point Cottage.

The hours of operation of the precinct will be 7am to 12 midnight Monday-Saturday (8am Sundays and Public Holidays), except for Constable's Cottage where it will be 8 am to 11 pm, Tuesday-Sunday.

The development consists of different buildings all to be upgraded and used for different activities, as follows:

Gap Bluff Precinct

Officers Mess

- Continued use as a function/reception centre.
- Refurbishment, internal alterations, replacement of roof and external landscaping.
- Including reception areas, kitchen, office and store, chapel, bridal rooms and amenities and a lift.
- Capacity for 115 for banquet-type functions, or 140 for cocktail functions.

Armoury

- Continued use as a function/reception centre.
- Refurbishment, internal alterations, addition of a second storey and side wing, and external landscaping.
- Including reception areas, bar, external lounge and terrace, kitchen, storage, amenities and a lift.
- Capacity for 140 persons for banquet-type functions, or 160 for cocktail functions on the Ground Floor and 110 persons for banquet-type functions, or 120 for cocktail functions on the First Floor.

Gap Bluff Cottage

- New use as short stay accommodation.
- Refurbishment, minor alterations and reconfiguration, and external landscaping.

<u>Camp Cove Precinct</u>

Constables Cottage

- New use as a café/restaurant.
- Refurbishment, internal alterations addition of an external dining area and rear extension, and external landscaping.
- Including dining areas, reception and bar, kitchen and amenities.
- Capacity for 72 diners, including 37 internal and 35 external seats.

33 Cliff Street

- New use as short stay accommodation.
- Refurbishment, minor alterations and reconfiguration, including excavation for a new garage, and external landscaping.

Green Point Cottage

- Continued use as short stay accommodation.
- Refurbishment, minor alterations and reconfiguration, and external landscaping

The location of the buildings are shown in Figure 2.

Figure 2 Location of buildings within the precinct (Extract from JPW Location Plan)

3.2 Potential Noise Receivers

The buildings within the development have different locations and are widely spread. The potential noise receivers for each building are as follows:

- Residential receivers along Cliff Street (typically number 2-7) potentially exposed to noise impacts from activities at the Armoury, Gap Bluff Cottage and Officers Mess, located approximately 100 metres South west.

Figure 3: Nearest Residential properties to Gap Bluff Precinct

- Residential receiver at number 1 Victoria Street potentially exposed to noise impacts from Constable's Cottage and from 33 Cliff Street building located approximately 25 metres South.

Figure 4: Nearest Residential properties to Camp Cove Precinct

4 NOISE CRITERIA

Noise impacts from the activities at the site can typically be assessed by noise criteria that may be imposed by various consent authorities. These include:

- Office of Liquor and Gaming Racing (OLGR)
- Environment Protection Authority including the
  - Industrial Noise Policy (INP)
  - Road Noise Policy (RNP)
  - Noise Guide for Local Government (NGLG)
- Other non-standard special event criteria
- Woollahra Council Development Control Plan (DCP) Criteria

4.1 OLGR Noise Criteria

The development will include the provision of liquor licensing. As such, noise from licensed premises are governed by criteria defined by the Office of Liquor Gaming and Racing (OLGR). The standard conditions are as follows:

> *The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz - 8kHz inclusive) by more than 5dB between 7:00am and 12:00midnight at the boundary of any affected residence.*
>
> *The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz - 8kHz inclusive) between 12:00 midnight and 7:00am 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 7:00am.*
>
> *Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by the Office of Liquor Gaming and Racing.*
>
> *This is a minimum standard. In some instances the Board may specify a time earlier than midnight in respect of the above condition.*
>
> *For the purposes of this condition, the LA10 can be taken as the average maximum deflection of the noise emission from the premises.*

4.2 NSW Industrial Noise Policy (INP)

Noise generated from commercial and industrial premises is generally assessed against the requirements of EPA Industrial Noise Policy. The policy sets out two separate criteria to ensure environmental noise objectives are met. The first criterion considers intrusive noise and the second is set to ensure the amenity of the land use is protected. The more stringent of these two is adapted for the assessment. This becomes the Project Specific Noise Levels which ensures that the intrusive noise is limited and the amenity is protected.

Intrusiveness Criterion

The intrusiveness of a stationary noise source may be considered acceptable if the average of the maximum A-weighted levels of noise, LAeq 15 minute from the source do not exceed by more than 5dB the Rating Background Level (RBL) measured in the absence of the source. This applies during all times of the day and night. There also exists an adjustment factor Ki to be applied according to the character of the noise. This includes factors such as tonal, fluctuating, low frequency, impulsive, intermittent etc. qualities of noise.

The RBL is determined in accordance with Section 3 - Determining existing noise levels of the policy.

The intrusiveness criterion is;

LAeq 15 minute + Ki < RBL+5

Amenity Criterion

To limit continuing increases in noise levels, the maximum ambient noise level within an area from commercial noise sources should not normally exceed the levels as specified in Section 2.2 of the policy. This protects against impacts such as speech interference and community annoyance. As for the intrusiveness criterion, a modifying factor should be applied to account for the characteristics of the noise source.

The recommended Acceptable Noise Level (ANL) for the amenity criterion is determined in accordance with Table 2.1 and Table 2.2 of the policy.

4.3 Sleep Disturbance

The EPA also provides some guidelines on sleep disturbance. The appropriate assessment of potential noise disturbance to sleep is currently under review. As a guideline the EPA have in the past sought to protect sleep arousal by ensuring that the $L_{1(60sec)}$ noise level of any specific source does not exceed the background L_{90} level by more than 15dB(A) outside a resident's bedroom window between 10pm and 7am. More recent studies have also indicated that $L_{1(60sec)}$ events with absolute levels above 55dB(A) may also have the potential for sleep disturbance.

4.4 Woollahra Council Heritage Conservation Area DCP

Woollahra Council have a specific Development Control Plan (DCP) for the Watsons Bay Heritage Conservation Area under section C3, dated 23rd May 2015.

Section 3.5.10 Acoustic and Visual Privacy requirements includes the following clause:

C12 The use of any premises is not to result in

a) Transmission of vibration to any other premises
b) An offensive noise as defined in the Noise Control Act 1975; and
c) a sound level at any point on the boundary of the site greater than the levels specified in the relevant Australian Standard

Section C12 is not specific in regards to the assessment of noise emissions. In particular:

- The DCP does not define a measurement parameter for assessing noise levels generated by the use of the premises. For the purposes of this assessment an $L_{eq(15\ minutes)}$ parameter has been considered. This would accord with the assessment parameter defined in the EPA Industrial Noise Policy for intrusive noise.

- The site does not directly adjoin residential properties. We will assess noise at the nearest residential boundaries.

- Australian Standards do not specify acceptable levels of environmental noise emissions. This is normally the domain of the Consent Authority such as Council, Environment Protect Authority or the Office of Liquor Gaming and Racing. We will relate the criteria to the existing background noise levels measured at the site.

4.5 Previous NSW National Parks Noise Criteria

We note the possible noise criteria for a range of function type have been previously prepared by SLR in an acoustic report to NSW National Parks dated 9th March 2012. These include a number of larger functions that are not part of this proposal.

Table 3 Recommended Event Categories and Noise Limits

Event Category	Description of Event(s)	Indicative Sound Power Level (Lw) of Event	Typical Frequency of Event(s)	Recommended Event Noise Limits
Category 1	Event with up to 1000 people with moderate to high output amplified music (e.g. live music concert)	128-135 dBA (Lmax)	Up to 4 per year	Event specific noise impact assessment and management plan is required prior to approval. Further details on what should be included in the noise impact assessment are provided in the Event Noise Guideline for The Gapp Bluff Centre.
Category 2	Function event with up to 250 people with low output amplified music (e.g. weddings, birthdays, corporate)	121 dBA (Lmax)	1-2 per week	10 am to 10pm (10 am to 11 pm Friday and Saturdays) LAmax noise level of no greater than background noise level (LA90) plus 10 dB. LCmax noise level of no greater than background noise level (LA90) plus 30 dB. At all other times No events to occur
Category 3	Event with up to 1000 people without amplified music (e.g. exhibition, markets)	114 dBA (Lmax)	Up to 4 per year	10 am to 10pm (10 am to 11 pm Friday and Saturdays) LAmax noise level of no greater than background noise level (LA90) plus 10 dB. At all other times No events to occur
Category 4	Function with up to 250 people without amplified music (e.g. weddings, birthdays, corporate)	107 dBA (Lmax)	1-2 per week	

Table 4 Site Specific Noise Limits for The Gapp Bluff Centre Events

Event Category	Period	Event Noise Limits (dB re 20 µPa)	
		LAmax	LCmax
Category 1	n/a	Event specific noise impact assessment and management plan is required prior to approval. Further details on what should be included in the assessment are provided in Appendix A of the Event Noise Guideline for The Gapp Bluff Centre.	
Category 2	Day (10am to 6pm)	49	69
	Evening (6pm to 10pm)	46	66
	Night (10pm to 11pm, Friday and Saturday only)	35	55
Category 3	Day (10am to 6pm)	49	-
	Evening (6pm to 10pm)	46	-
	Night (10pm to 11pm, Friday and Saturday only)	35	-
Category 4	Day (10am to 6pm)	49	-
	Evening (6pm to 10pm)	46	-
	Night (10pm to 11pm, Friday and Saturday only)	35	-

Table 1 Noise Limits from SLR report

4.6 Mechanical Plant Noise Criteria

Limits for noise from mechanical plant are included in Development Control Plan section C3.5.10 Acoustic and visual privacy as follows:

C7 Electrical, mechanical, hydraulic and plant equipment are to be suitably housed so as to not to create an 'offensive noise', as defined in the Noise Control Act 1975.

These goals would typically require that noise from any new plant associated with the refurbishment and upgrade not exceed the existing background noise levels

5 NOISE SURVEY

PKA personnel have visited the site to conduct a noise survey.

Noise monitoring was conducted on site from 27th of March to 7th of April 2015. Two noise monitors were used for the survey as follows:

- Monitor 1 – located at the park lookout opposite 5-7 Cliff Street residential receivers.
- Monitor 2 – located at the far end close to 33 Cliff Street building representing 1 Victoria street receiver environment.

The position of noise monitors are shown in Figure 1.

In addition, measurements were made overnight to obtain the ambient and background noise spectrum. A NTI noise analyser with the capability of recording octave band frequencies was installed on site on 14th April for 24 hours. The night time spectrum thus obtained was used and was applied to the lowest background L_{90} values to establish the criteria.

5.1 Instrumentation

Noise measurements were conducted using the following equipment:

- Environmental Data Logger ARL Serial number 15-301-475.
- Environmental Data Logger ARL Serial number 16-707-037.
- NTI model XL2-TA Serial number A2A-06988-E0
- Sound calibrator B&K 4230, Serial number 9299985

The instruments were calibrated immediately before and after the noise measurements and there were no adverse deviations between the two.
The data loggers are type 1 and comply with AS1259.2: 1990. The instruments carry traceable calibration certificates.

5.2 Ambient Noise Levels and INP criteria

Noise data from the monitors was used to establish the ambient and background noise levels. During noise monitoring the weather was inclement on occasions with periods of significant rain fall occurring on 31/3, 1/4, 3/4, 4/4, 5/4 and 7/4. Data on those days cannot be taken to represent the existing background noise levels. For those periods where adverse weather

conditions prevailed, the background noise data was disregarded. Table 2 below presents the measured ambient noise levels. Values have been rounded to the nearest 0.5 dB

For the purposes of this assessment the results were divided into standard Daytime, Evening and Night time periods as required by the Environment Protection Authorities Industrial Noise Policy (INP). The amenity criteria is based on a suburban classification. The residential areas and the monitoring positions are not affected by noise from industrial sources.

Receiver Type	Location represented	Period	Existing noise levels		Acceptable Noise Levels	INP Noise Criteria		
			LAeq	RBL		Amenity LAeq(period)	Intrusiveness LAeq(15 minutes)	Project Specific Levels LAeq(15 minutes)
Residential	5-7 Cliff Street	Day	51.0	40.5	55	55	45.5	45.5
		Evening	51.0	39.5	45	45	44.5	44.5
		Night	46.0	33.0	40	40	38.0	38.0
Residential	1 Victoria Street	Day	52.5	39.5	55	55	44.5	44.5
		Evening	55.5	38.0	45	45	43.0	43.0
		Night	46.0	33.5	40	40	38.5	38.5

Table 2 Ambient Noise Levels and INP Noise Criteria

5.3 Sleep disturbance

Sleep disturbance can occur during night time operational hours of the precinct. To establish the sleep disturbance criteria, we have considered the minimum background noise levels of the loggers' data between 10 pm and 12 midnight and 10pm to 11 pm for those receivers close to the Constable's Cottage as this closes at 11 pm. The lowest L_{90} background levels and the criteria are shown in Table 3.

Location	Time	Day/Date	Min L_{90} background	Criteria (background +15) L_{MAX}
5-7 Cliff St	11:45 pm	Monday/30-03-15	30.5	45.5
1 Victoria St	10:45 pm	Sunday/29-03-15	35.5	50.5

Table 3 Sleep Disturbance Criteria

5.4 OLGR noise criteria

Based on the lowest night time background values above and the night time measurements, the octave band frequencies for the lowest background were obtained during. The lowest background noise for the premises nearest Constable Cottage is taken at 11 pm as that is the proposed closure time. Similarly the lowest background noise for the residential premises nearest the Gap Bluff Precinct is taken at 12 midnight.

Table 4 presents the Office of Liquor Gaming and Racing (OLGR) noise criteria. Values have been rounded to the nearest 0.5 dB.

Location served by logger	**(dBA)**	**Maximum Sound Pressure Level Octave Band Frequency (Hz)**									**dBA**
		31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
5-7 Cliff Street	Min Night time L90	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5	30.5
	OLGR L_{10} Criteria (before Midnight)	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5
1 Victoria Street	Min Night time L90	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5
	OLGR L_{10} Criteria (before 11pm)	49.5	45.5	41.5	38.5	37.5	35.5	31.5	30.5	23.5	40.5

Table 4 OLGR Criteria

Note that higher noise limits will apply where the noise source ceases before the time noted (eg windows are closed after a certain time or where the function ceases earlier than the time noted).

5.5 DCP noise criteria

The Watsons Bay Heritage Conservation Area DCP criteria requires the following

C12 The use of any premises is not to result in

a) Transmission of vibration to any other premises
b) An offensive noise as defined in the Noise Control Act 1975; and
c) a sound level at any point on the boundary of the site greater than the levels specified in the relevant Australian Standard

The relevant Australian Standard is AS 1055 Description and Measurement of Environmental Noise 1997 (parts 1 to 3). It is not the intent however of the Standard to provide prescriptive noise limits. It provides guidance for the measurements and evaluation of environmental noise and provides guidance in setting noise limits. It is not however a regulatory document and it remains the role of the consent authority to specify noise limits.

We note also that there are no residential boundaries immediately adjacent the boundaries of the sites (other than the Green Point Cottage). In those instances we have assessed noise emissions to the nearest residential boundaries rather than the site boundaries. For the purposes of meeting the DCP criteria we have utilised the following parameters:

i) The exceedance limit is 0 dB above background
ii) The measurement parameter is $L_{EQ(15\ minutes)}$

Again, based on the lowest night time background values above and the night time measurements, the octave band frequencies for the lowest background were obtained during a separate measurement. The lowest background noise for the premises nearest Constable Cottage is taken at 11 pm as that is the proposed closure time. Similarly the lowest background noise for the residential premises nearest the Gap Bluff Precinct is taken at 12 midnight. Table 5 presents the DCP noise criteria. Values have been rounded to the nearest 0.5 dB.

Location served by logger	**(dBA)**	**Maximum Sound Pressure Level Leq Octave Band Frequency (Hz)**									**dBA Leq**
		31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
5-7 Cliff Street	Min Night time L90 (before midnight)	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5	30.5
	DCP L_{eq} Criteria(before midnight)	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5	30.5
1 Victoria Street	Min Night time L90	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5
	DCP L_{eq} Criteria (before 11pm)	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5

Table 5 DCP Criteria

Note that higher noise limits will apply where the noise source ceases before the time noted**.** (eg windows are closed after a certain time or where the function ceases earlier than the time noted).

We note that while the limits of the DCP may require 0 dB above background, compared to the OLGR criteria of background +5, the outcome is likely to be similar. This is because the use of the Leq measurement parameter for the DCP is closer to an "average" noise level compared with the "average maximum" levels required by the L_{10} OLGR criteria.

6 ASSESSMENT

The relevant criteria for control of noise emissions from the development are presented in Section 5. The noise emissions from each building and the impact effect on the corresponding receiver has been considered.

The Green Point Cottage, 33 Cliff Street building and the Gap Bluff Cottage will be used for accommodating guests and as such will not have noise levels above those from typical residential uses. The main source of noise from these buildings would be the noise from mechanical services which needs to be considered at the CC stage after finalisation of the design and selection of the mechanical equipment. As those buildings are expected to have minimum noise impact, they are not considered in the assessment at this stage.

Noise sources - patrons and use

The main sources of noise within the internal or external spaces of the Constables Cottage, Armoury and the Officers Mess will be as follows:

- Human voice,
- Amplified music (eg DJs or recorded music)

The noise levels of human voice was based on data obtained from Handbook of Noise Control, Harris & Crede and is presented in the following Table 6.

Description	dB(A)	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Log Avg male / Female Speech at 1 m Leq, raised voice level	64	41*	47*	53	59	62	59	55	50	45
Allowance for L10	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
Log Avg male / Female Speech at 1 m L10, raised voice level	67	45*	51*	57	63	66	63	59	54	49
Log Avg male / Female Speech at 1 m Leq, normal voice level	57	36*	42*	48	54	57	51	47	44	39
Allowance for L10	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
Log Avg male / Female Speech at 1 m L10, normal voice level	61	40*	46*	52	58	61	54	51	48	43

Table 6 Patron Speech Levels

Note : For Speech, the values at frequencies 31.5 and 63 Hz shown by * are estimated as data as these are not available at the reference source. In any event, vocal output at these frequencies can be considered as negligible.

Reception Music in the Armoury and Officers Mess

The Armoury and Offices Mess buildings will continue to host reception and function events following their alteration and refurbishment. The internal noise levels will therefore be higher than those typically occurring in Constables Cottage.

Noise from amplified music from a typical system, played within a hall has been previously measured and was obtained from PKA database. The following Table 7 presents the noise data

Noise Source	Descriptor	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Amplified music measured within a medium size venue	$L_{eq(15\ minute)}$	90	58	90	94	86	86	88	79	72	63
	Converted values $L_{10(15\ minute)}$	94	62	94	98	90	90	92	83	76	67

Table 7 Noise level for amplified music

The data is representative of moderate music levels only as would be typical during a wedding or corporate function. It is not the primary intent of proposal to have musical or night club style events and as such we have not considered the elevated music noise levels often part of music events.

6.1 Constable's Cottage

Constable's Cottage is to be used as a café and a dining area following its refurbishment. The internal spaces consist of dining areas, kitchen, reception/bar and toilets. The cottage also has external dining area. The internal and external spaces can accommodate 37 and 35 patrons respectively.

As part of the refurbishment it is proposed to provide acoustic screening to the outdoor areas in the form of solid glazed screens, operable blinds and operable vergola style roofing.

The purpose of the screening measures is to mitigate noise impacts to residential boundaries. It is anticipated that the operable part of the roof and screens would be closed during the evening and night time hours. While the roof and screening is subject to future detailed design, we have made a nominal allowance for the expected reduction offered by the screens assuming they are closed at 5pm.

6.1.1 Internal spaces

The emanating noise from 37 patrons sitting inside was calculated to the nearest residential neighbour at 1 Victoria Street.

The attenuation effects of the building fabric, distance and directivity were considered in the calculations. We have allowed for the existing standard heritage windows and doors without special acoustic treatment. In order to mitigate noise transmission from the cottage it is proposed that the windows facing Victoria Street remain closed during the operation of the Cafe.

We would recommend however that the new bi-fold doors be provided with a nominal acoustic rating of Rw 30 as a matter of course to minimise noise transmission from the large dining rooms.

A summary of the results is presented in Table 8.

Description	dB(A)	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Expected Noise levels in side cafe										
Patrons speech inside café - 37 people total, divided into rooms shown in drawing -talking with normal+ occasional raised voice $L_{eq(15\ minutes)}$	68	41	50	58	64	67	63	59	55	49
Patrons speech inside café - 37 people total, divided into rooms shown in drawing -talking with normal+ occasional raised voice $L_{10\ (15\ minutes)}$	72	45	54	64	66	70	68	64	59	53
Windows Closed										

Description	dB(A)	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Calculated Noise level at Victoria Street Receptor boundary $L_{eq(15\ minutes)}$	18	-	24	25	20	17	11	7	2	-
Calculated Noise level at Victoria Street Receptor boundary $L_{10(15\ minutes)}$	22	-	18	30	21	19	15	12	6	1
DCP L_{eq} Criteria (up to 11pm)	35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5
DCP criteria met at 11pm?	Yes with windows closed									
Criteria (OLGR) L_{10} –up to 11 pm	40.5	49.5	45.5	41.5	38.5	37.5	35.5	31.5	30.5	23.5
OLGR criteria met at 11pm?	Yes with windows closed									
INP Criteria L_{Aeq} Day	44.5	-	-	-	-	-	-	-	-	-
INP Criteria L_{Aeq} Evening	43	-	-	-	-	-	-	-	-	-
INP Criteria L_{Aeq} Night	38.5	-	-	-	-	-	-	-	-	-
INP Criteria met at 11pm?	Yes windows open or closed									

Table 8 Noise breakout from indoor dining areas

The analysis concludes that noise from within the Café internal dining spaces will meet the DCP, OLGR and INP criteria up to 11pm with the windows closed.

6.1.2 External spaces

The external dining area of the cottage can accommodate 35 patrons. Calculations were carried out on the basis that patrons are well spread over the defined external dining areas. It is reasonable to expect that only half the patrons will talk at any time.

An assessment was carry out using a combination of normal and raised voice levels in order to model patrons within a small outdoor cafe. It is reasonable to expect that only half the patrons will talk at any one time. We have not modelled consistently loud or shouting levels as we do not consider that this would be commensurate with a café style operation. Shouting or loud voices would cause an exceedance of the relevant noise criteria.

The resulting noise level was calculated to the receiver boundary at 1 Victoria Street. The attenuation effects of distance and directivity were considered in the calculations.

It is anticipated that the operable part of the roof and screens would be closed during the evening and night time hours. While the roof and screen is subject to future detailed design we have made a nominal allowance for the expected reduction offered by the screens assuming they are closed at 5pm. A summary of the calculations is shown in Table 9.

Location / Scenario	**dB(A)**	**Octave Band Centre Frequency (Hz)**								
		31.5	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Scenario 1 Patrons speech outdoors- 35 patrons, talking with normal and raised voices Roof and Screens Open - calculated noise level at receptor boundary Victoria Avenue										
$L_{eq(15\ minute)}$	43	-	26	33	39	43	38	35	30	25
$L_{10(15\ minute)}$	47	-	30	37	43	47	42	38.5	34	29
Scenario 2 Patrons speech outdoors- 35 patrons, talking with normal voices Roof and Screens Open - calculated noise level at receptor boundary Victoria Avenue										
$L_{eq(15\ minute)}$	39	-	24	31	37	39	33	29	26	21
$L_{10(15\ minute)}$	43	-	28	34.5	41	43	37	33	30	25
Scenario 3 Patrons speech outdoors- 35 patrons, talking with normal and raised voices Roof and Screens Closed - calculated noise level at receptor boundary Victoria Avenue										
$L_{eq(15\ minute)}$	32	-	14	21	27	30	26	22	18	12

Location / Scenario	dB(A)	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
DCP Criteria up to 11pm $L_{eq(15\ minutes)}$	**35.5**	**44.5**	**40.5**	**36.5**	**33.5**	**32.5**	**30.5**	**26.5**	**25.5**	**18.5**
Compliance to 11pm	**Yes with blinds and screens closed**									
$L_{10(15\ minute)}$	35	-	18	25	31	34	30	26	22	16
OLGR Criteria up to 11pm $L_{10(15\ minutes)}$	**40.5**	**49.5**	**45.5**	**41.5**	**38.5**	**37.5**	**35.5**	**31.5**	**30.5**	**23.5**
Compliance to 11pm	**Yes with blinds and screens closed**									

Table 9 Noise breakout from outdoor dining areas – DCP/OLGR criteria

Location	Period	INP Project Specific Criteria	Constable's Cottage (outdoors) screens open		Constable's Cottage (outdoors) screens closed	
			SPL @ receiver	Complies (Y/N)	SPL @ receiver	Complies (Y/N)
1 Victoria Street	Day	44.5	43-47	Y*	32	Y
	Evening	43	43-47	N	32	Y
	Night	38.5	43-47	N	32	Y

Table 9a Noise breakout from outdoor dining areas – INP criteria

*some exceedance where raised voices become predominant at full capacity

The calculations and summary results indicate that the compliance with possible limiting criteria can be expected to be achieved depending on operating conditions and time of day.

A review of the existing background noise levels in the noise logger charts indicate that for most of the daytime time hours up to 5 pm it should be possible to operate the café with the vergola roof and screens open, depending on patron numbers and location. The charts indicate however that the background noise earlier in the week (Monday and Tuesdays) the background noise during the day is lower than later in the week. In those situations the screens may need to be closed when the café is at full capacity.

It will be necessary in any event to close the screens after 5 pm on any day. While the design of the screen has yet to be finalised our preliminary calculations indicate that the Development Control Plan, Office of Liquor Gaming and Racing LGR and the Industrial Noise Policy criteria can be met with the proposed roof and screens closed.

6.1.3 Sleep Disturbance criteria

In the event that the café / restaurant is open between the hours of 10 pm to 11pm an additional sleep disturbance criteria is applicable.

From section 5.3 the criteria is for maximum noise levels to not exceed 50.5 dB(A). The maximum noise levels are higher than an average Leq or L10 and are typically the maximum measured over the sample period

The estimated maximum noise levels for the night time period of 10pm to 11pm are 53 dB(A). This may reduce to 47 dB(A) with low voice levels and the patrons located at the most distant end of the dining area.

This would be mitigated satisfactorily by the proposed roof and screen arrangement when closed.

6.1.4 Noise Mitigation and Management.

The refurbishment proposal for the Cottage has incorporated a number of noise control features in the preliminary designs in order to mitigate and control noise from the proposed Restaurant and Café use. Additional design development will be carried for the acoustic controls during the preparation of construction documentation. The following sections outline the key features and requirements of the proposed noise controls

The alterations to the building are mostly limited to internal refurbishment apart from the external screening arrangement. While it is not proposed to upgrade the windows the following items should be incorporated during the design detail stages:

- New air conditioning plant is proposed, providing mechanical ventilation systems that provide the necessary outside air requirement without requiring windows and doors to be open. The detailed design of the mechanical systems will incorporate necessary enclosures and silencers to ensure that noise emissions from the plant itself is in compliance with the requirements of the Development Control Plan.

- Inclusion of acoustically designed roof and screen structure in order to provide the required noise reduction. The proposed layout is shown indicatively in the architectural drawings. In principle it will comprise:

  A Vergola type roof closing to form an airtight seal

  PVC blinds of sufficient mass to provide the required noise reduction. When closed they will seal to the bottom and sides the required tracks. The Pelmets around the top of the blinds will be suitably enclosed and seal to the awning structure.

The layout of the awning has been designed to provide acoustic screening between the outdoor dining areas and the residential property opposite. The use of the screen is required at the minimum during the night time hours after 5 pm.

- Music will is not be used in the outdoor dining areas.

- Service deliveries, bottle and Garbage collection will be limited to the daytime hours only. Where it is necessary to collect rubbish and bottles immediately on cessation of a night time trading will be carried out entirely within the building, with windows and doors closed. Disposal to external bins will not be carried out during the night time hours.

- Conduct the cafe operation in accordance with the Responsible Services of Alcohol Legislation. It will not be feasible to comply with the Development Control Plan or Office of Liquor Gaming and Racing requirements in the event of unruly behaviour or loud voices

6.2 33 Cliff Street

The property at 33 Cliff Street is an existing residential dwelling. The proposal will allow for a new use as a short stay accommodation. Alterations are relatively minor including refurbishment, a new garage and a new outdoor deck. There is generally unlikely to be noise impact arising from most of the new use. We do note the presence of a new terrace and conceivably some additional noise may arise from its use.

An assessment was carry out using a combination of normal and raised voice levels patrons within a small outdoor cafe. It is reasonable to expect that only half the patrons will talk at any one time. We have not modelled consistently loud or shouting levels as we do not consider that this would be commensurate the proposed use. Shouting or loud voices would cause an exceedance of the relevant noise criteria.

The resulting noise level was calculated to the receiver boundary at 1 Victoria Street. The attenuation effects of distance and directivity were considered in the calculations. We have shown only the DCP criteria in this instance as 33 Cliff Street will not be a licensed premises.

A summary of the calculations is shown in Table 9.

Location / Scenario	dB(A)	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
$L_{eq(15\ minute)}$	38	-	-	28	34	38	33	30	25	20
DCP Criteria up to 11pm $L_{eq(15\ minutes)}$	**35.5**	**44.5**	**40.5**	**36.5**	**33.5**	**32.5**	**30.5**	**26.5**	**25.5**	**18.5**
Compliance to 11pm	Some exceedance likely									

Table 9 Noise breakout from outdoor terrace areas – DCP criteria

Location	Period	INP Project Specific Criteria	33 Cliff Street	
			SPL @ receiver	Complies (Y/N)
1 Victoria Street	Day	44.5	38	Y
	Evening	43	38	Y
	Night	38.5	38	Y

Table 9a Noise breakout from outdoor terrace – INP criteria

The calculations and summary results indicate that the compliance with possible limiting criteria can be expected to be achieved depending on operating conditions and time of day.

Some exceedance of the Development Control Plan (DCP) criteria is possible during the night time hours, however the DCP criteria may not necessarily be applicable to small domestic type outdoor terrace. A more relevant comparison may be to a deck or terrace that Council would ordinarily approve as part of a complying construction.

In any event the premises will be operated in accordance with the Holiday and Short Term Rental Code of Conduct 24 March 2015 published by the Holiday Rental Industry Association.

In particular, item 3.8 in the code has rules and penalties applicable for offensive noise:

3.*8 Noise and Residential Amenity*

a) Guests and Visitors must not create noise which is offensive to neighbours especially between 10pm-8am and during arrival and departure at any time throughout the occupancy.

b) Offensive noise is prohibited and may result in:
- *i. Termination of permission to occupy the Property;*
- *ii. Eviction;*
- *iii. Loss of rental paid; and*
- *iv. Extra charges for security and other expenses which may be deducted from Security Deposits or Bonds.*

c) Guests and Visitors must abide by any noise abatement conditions, standards and orders issued by police or any regulatory authority to minimise impacts upon the residential amenity of neighbours and local community.

6.3 The Armoury

The Armoury building will be altered to become a 2 storey building. It will have a continuing use as a function and reception centre. Internally, the alterations would include reception areas, bar, kitchen, storage, amenities and a lift.

The existing outdoor terrace at ground level would be retained and a new first floor outdoor terrace would be provided as part of the alterations.

The ground level can accommodate 140 patrons in the form of a banquet or 160 as cocktail type reception. The 1st floor capacity figures will be 110 and 120 respectively.

The Armoury building will include acoustic measures to control noise breakout from both indoor and outdoor spaces. While subject to detailed acoustic design the measures will include:

- Acoustic rated roof and ceiling for the new upper level
- Acoustic rated glazed facades and doors
- Extended height glass balustrades serving as an acoustic screen around the upper floor terrace area
- Extendable heavy weight PVC blinds around the lower level terrace area
- Sound absorptive acoustic treatment to the underside of the terrace roof on both levels

6.3.1 Internal noise breakout

We have considered the possibility of noise breakout from the internal spaces of the proposed function centre. While it is not the intent to provide a night club style or level of music it is reasonable to expected a moderate degree of music to accompany many functions.

The emanating noise from an indoor amplified music system (or DJ type music) with a level of Leq 90 dB(A) was considered and was calculated to the nearest residential neighbours in Cliff Cliff Street. The internal and outdoor areas are separated by large glass areas and bi-folding doors.

We have calculated noise transmission with windows and doors both open and closed. In the calculation of noise with the glazing closed we have allow for a an acoustic performance of Rw 33, which could be expected with proprietary hinged or bi-fold doors with acoustic seals and 6.38 laminated glass.

The attenuation effects of the building fabric, distance and directivity were considered in the calculations.

A summary of the calculated results is presented in Table 11.

Description	Parameter	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Amplified music inside function room	$L_{eq(15\ minute)}$	90	58	90	94	86	86	88	79	72	63
	$L_{10(15\ minute)}$	94	62	94	98	90	90	92	83	76	67
Calculated noise level at the receiver boundary windows and doors to terrace fully open (components from both levels)	$L_{eq(15\ minute)}$	43	-	43	48	39	39	41	32	25	16
	$L_{10(15\ minute)}$	47	-	47	52	43	43	45	36	29	20
Calculated noise level at the receiver boundary windows and doors to terrace closed (components from both levels)	$L_{eq(15\ minute)}$	19	-	24	31	19	15	13	6	-	-
	$L_{10(15\ minute)}$	23	-	28	35	23	19	17	10	-	-
DCP Criteria (Cliff St)	$L_{eq(15\ minute)}$	30.5	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5
Criteria (OLGR)	$L_{10(15\ minute)}$	35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5
INP L_{Aeq} Night		35	-	-	-	-	-	-	-	-	
INP Sleep disturbance L_{AMAX}		45.5	-	-	-	-	-	-	-	-	-
Comment		Compliance with criteria achieved with windows and doors closed Compliance not achieved with windows and doors open									

Table 11 Noise breakout from indoor spaces

The above calculations and summary results indicate that the noise levels from the internal spaces of the Armoury will exceed the criteria when the windows and door doors are left fully open.

It is feasible to expect that noise emissions from functions within the Armoury Building can be compliant with the OLGR and INP criteria when windows and doors are closed.

It will therefore be necessary to ensure that windows and doors are closed when music is played within the function rooms

Noise mitigation and management will be applied in order to eliminate or minimise the possibility of noise complaint.

6.3.2 Noise From outdoor terraces

The external terrace areas will be separated from the internal reception areas by large areas of fixed and operable glass walls. As such we have carried out separate calculations for noise transmissions from the outdoor spaces. Noise from the internal space can be effectively controlled by the façade construction while those from the terraces can only be controlled by the proposed external screens and management.

Noise from patrons on the terraces areas will naturally be dependent on the number, speech levels and the behaviour of the patrons on those areas.

Noise from patrons using the balcony was calculated to the residential buildings at Cliff Street. Considering the capacity of the venue and the area ratios it was assumed that there will be 35 people using the balcony when needed. Noise from 35 people on each balcony (total 70), 50% talking in normal and 50% talking in raised voice was calculated to the boundary of the receivers at Cliff Street. The attenuation effects of distance and directivity were considered in the calculations. A noise level drop of 3 dBA was allowed for the ground absorption and the foliage over 100 m distance. The following Table 12 presents a summary of the results.

The calculations allow for the inclusion of the proposed noise control treatment described in section 6.2. While the acoustic measures are subject to future detailed design we have made a nominal allowance for the expected reduction offered allowing for heavy weight thickness PVC.

Description	Parameter	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Calculated Noise level at the receiver boundary with operable screen on ground level terrace open	$L_{eq(15\ minute)}$	32	-	16	22	28	31	27	23	19	13
	$L_{10(15\ minute)}$	36	-	20	26	32	35	31	27	23	17
Calculated Noise level at the receiver boundary with operable screen on ground level terrace closed	$L_{eq(15\ minute)}$	22	-	18	20	20	22	16	12	7	1
	$L_{10(15\ minute)}$	26	-	22	24	24	26	20	16	12	5
Noise level at the receiver boundary Lmax est		44	-	-	-	-	-	-	-	-	-
DCP L_{eq} Criteria (Cliff St)		30.5	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5
Criteria (OLGR) L_{10}		35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5
INP L_{Aeq} Night		35	-	-	-	-	-	-	-	-	-
INP Sleep disturbance L_{Amax}		45.5	-	-	-	-	-	-	-	-	-
Comment		Compliance with INP criteria expected Compliance achieved with DCP / OLGR criteria with ground level terrace screen closed after 10 pm									

Table 12 Noise breakout from the external lounge (balcony)- ground level

Description	Parameter	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Calculated Noise level at the receiver boundary with operable screen on 1st level terrace including allowance for glazed screen	$L_{eq(15\ minute)}$	27	-	11	17	23	26	22	19	14	8
	$L_{10(15\ minute)}$	31	-	15	21	27	30	26	23	18	12
Noise level at the receiver boundary Lmax est		40	-	-	-	-	-	-	-	-	-
DCP L_{eq} Criteria (Cliff St)		30.5	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5
Criteria (OLGR) L_{10}		35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5
INP L_{Aeq} Night		35	-	-	-	-	-	-	-	-	-
INP Sleep disturbance L_{Amax}		45.5	-	-	-	-	-	-	-	-	-
Comment		Compliance with INP criteria expected Compliance achieved with DCP / OLGR criteria with upper level terrace screen									

Table 13 Noise breakout from the external lounge (balcony)- upper level

While the design of the upper and lower screen is yet to be finalised our preliminary calculations indicate that the OLGR and INP criteria can be met with the upper level screen constructed and the lower level screen blind closed after 10 pm.

6.3.2 Noise Mitigation and Management

In order to mitigate and control noise from the proposed Armoury Building there are a number of measures that will be incorporated both for the construction and the management of the premises.

Building Controls

The alterations to the building will allow the opportunity to upgrade the envelope of the building beyond the current capacity. The following items will be incorporated during the design detail stages:

- Provision of acoustic rated façade systems. This will include glazing to a minimum of Rw 33, together with acoustic rated sealing systems for door and windows.
- An extendable blind system for the ground floor terrace that can be unrolled during the night time hours or when necessary. This is shown indicatively in the architectural drawings. The blind would be closed after 10 pm
- A glass balustrade to all sides of the upper floor terrace of sufficient height to provide acoustic screening between the patrons and the residential area. This is shown indicatively in the architectural drawings.
- Sound absorptive treatments to the underside of the upper terrace and to the underside of the partial roof over the upper terrace
- Sound absorptive panelling to any available non glazed wall area behind the terrace
- Acoustic rated construction to the remainder of the building envelope such as the roof / ceiling and any new external walls.
- New air conditioning plant, mechanical ventilation systems that provide the necessary outside air requirement without requiring windows and doors to be open. Inclusion of acoustically attenuated outside air and relief air systems.
- Air conditioning and kitchen ventilation plant that complies with all local acoustic consent conditions.
- A single opening that will be used for terrace access without requiring the use of large bi-fold door areas. This will assist with minimising noise transmission from the internal spaces to the external environment.

Management Controls

- An internal noise limiting system for the sound systems within the premises. The sound system will be incorporated as part of the building alterations enabling the use of more sophisticated built in limiters. These would be set up and controlled purely by Gap Bluff Hospitality P/L. We note the presence of the existing internal plaques providing internal limits of 85 dB(A). It may be possible for the new upgraded construction to allow for higher internal noise levels when the external doors are closed. An interim limit of 90 dB(A) Leq is recommended.
- Windows and doors will be closed when music is playing in the internal spaces.
- Service vehicle, bottle and Garbage collection will be limited to the daytime hours only. Where it is necessary to collect rubbish and bottles immediately on cessation of a night time function this will be carried out entirely within the building, with windows and doors closed. Disposal to external bins will not occur during the night time hours.

- Night time function finishing times will be staggered where possible functions in the upper and lower rooms to minimise peak traffic and patron flows from the venues.
- Coaches awaiting patron pickup will not be permitted to idle for an extended period of time during the night time hours.
- Supervision will be provided of exiting patrons on completion of the function in order to ensure an orderly departure.
- The venue operation will be conducted in accordance with the Responsible Services of Alcohol Legislation to prevent unruly behaviour or loud voices

6.4 Officers Mess

The Officers Mess is a 2 storey building and will be used for functions such as wedding receptions and corporate parties. The two levels can hold independent functions. The internal spaces will consist of a reception / function spaces (1 on the ground floor, 3 on the upper floor) kitchen, a bridal room, stairs, and toilets. The building on the ground level also has a veranda area facing north. The ground level can accommodate 70 patrons in the form of banquet or 80 as cocktail type reception. The 1st floor figures will be 45 and 50 respectively.

The building has an open area in the front which can be used during weddings. This outdoor area will not be used for high level noise activities but should be considered in the assessment.

6.4.1 Noise Emissions from indoor spaces

We have considered the possibility of noise breakout from the internal spaces of the Officers Mess Building in a similar manner to that considered for the Armoury building. While it is not the intent to provide a night club style or level of music it is reasonable to expect a moderate degree of music to accompany many functions. The noise emanating from an indoor amplified music system with a level of Leq 90 dB(A) was considered and was calculated to the nearest residential properties on Cliff Street.

Unlike the Armoury building however it is not proposed to upgrade the existing heritage windows to the Officers Mess Building. Instead of allowing for acoustic rated window systems, we have allowed for a more moderately rated unsealed system. A summary of the results is presented in Table 13, showing the combined noise levels from upper and lower levels in the officers mess building.

Description	Parameter	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Amplified music inside each reception space	$L_{eq(15\ minute)}$	90	58	90	94	86	86	88	79	72	63
	$L_{10(15\ minute)}$	94	62	94	98	90	90	92	83	76	67
Calculated noise level at Cliff Street receiver boundaries, windows to Offices Mess open	$L_{eq(15\ minute)}$	42	-	41	46	37	37	39	30	23	14
	$L_{10(15\ minute)}$	46	-	45	50	41	41	43	34	27	18
Calculated noise level at Cliff Street receiver boundaries, windows	$L_{eq(15\ minute)}$	24		34	32	24	20	20	12	4	-

Description	Parameter	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
to Offices Mess closed	$L_{10(15\ minute)}$	29	-	38	37	28	24	25	16	9	-
DCP L_{eq} Criteria	$L_{eq(15\ minute)}$	30.5	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5
Criteria (OLGR) L_{10}		35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5
INP L_{Aeq} Night		35	-	-	-	-	-	-	-	-	-
INP Sleep disturbance L_{AMax}		45.5	-	-	-	-	-	-	-	-	-
Comment		Compliance with criteria achieved with windows and doors closed Compliance not achieved with windows and doors open									

Table 14 Noise breakout from indoor spaces

The above calculations and summary results indicate that the noise levels from the internal spaces of the Officers Mess Building will exceed the criteria when the windows and door doors are left open.

It is feasible to expect that noise emissions from functions within the Officers Mess Building can be compliant when windows and doors are closed. The above calculations and summary results indicate that noise from the internal reception areas of the Officers Mess building complies with the criteria therefore no mitigation measures will be required to building structure itself, provided internal music noise is adequately controlled.

Our calculations have indicated noise levels to boundaries would be compliant on the basis of 90 dB(A) inside the offices mess building. A lower level of 85 dB(A) would however be necessary to ensure that the noise from the officer mess building does not adversely combine with the noise component from the Armoury Building.

6.4.2 Outdoor area.

The Officers Mess building has a large outdoor area in the front some 25 m distance away from the building. This outdoor area may be used during wedding receptions for taking photos, or as part of the ceremony outside.
Noise from 100 people using this outdoor area was calculated to the nearest residential receivers at Cliff Street. As previously we have modelled a small crowd of people allowing that half the people will be talking at any time, of which 50% will be talking in normal voice and 50% in raised voice. The attenuation effects of distance and directivity were considered in the calculations. A 3 dBA noise drop was allowed for ground and foliage absorption. A summary of the results is presented in Table 14.

Location	Parameter	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
Calculated noise level at Cliff Street receiver boundaries	$L_{eq(15\ minute)}$	42	-	-	32	37	41	37	33	29	23
	$L_{10(15\ minute)}$	46	-	-	36	41	45	41	37	33	27
Noise level at the receiver boundary L_{AMax} (est)		51	--	-	-	-	-	-	-	-	-
Criteria DCP L_{eq} (5-7 Cliff St)		30.5	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5
Criteria (OLGR) L_{10} (Night)		35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5
INP L_{Aeq} Night		35	-	-	-	-	-	-	-	-	-
INP Sleep disturbance L_{AMAX}		45.5	-	-	-	-	-	-	-	-	-
Comment		Compliance with DCP / OLGR during most daytime hours Compliance with night INP criteria not expected - Compliance not achieved with night OLGR and DCP criteria									

Table 14 Noise breakout from the external area

The above calculations and summary results indicate that noise from the use outdoor area opposite the Officers Mess may not comply with the noise criteria during the evening and night time hours. Compliance would be achieved for most daytime hours allowing for 100 people congregating. A reduced sized crowd of 50 people would allow compliance during all the daytime hours.

It is recommended that the use of the outdoor areas surrounding the Officers Mess or functions such as wedding ceremonies or festivals only be during the daytime hours of 7am to 6pm. We expect that this would allow compliance with typical noise criteria during these hours.

Outdoor music is generally not recommended except at low background levels.

6.3.3 Noise Mitigation and Management

In order to mitigate and control noise from the existing Officers Mess Building there are a number of measures that will be incorporated for both for the construction and the management of the premises. These are similar to those for the Armoury building but modified to suit the specifics of the Officers Mess building.

Building Controls

The alterations to the building are limited to internal refurbishment and replacement of the existing roof / ceiling structure. While it is not proposed to upgrade the windows the following items will be incorporated during the detailed design stages:

- Acoustic rated construction to the remainder of the building envelope such as the roof / ceiling (commensurate with the existing windows)
- New air conditioning and mechanical ventilation systems that provide the necessary outside air requirement without requiring windows and doors to be open. The plant will incorporate acoustically attenuated outside air and relief air systems.
- Air conditioning and kitchen ventilation plant complying with all local acoustic consent conditions.

Management Controls

- Windows will be closed after 6pm or when music is to be played in the internal spaces
- The use of the outdoor area nearby the Officers Mess building for functions such as Wedding Ceremonies and festivals will be limited to the daytime hours of 7am to 6pm. Music will be either not played or at low levels (approximately 60 dB(A) maximum at 1m from any speaker).
- An internal noise limiting system will be provided for the sound systems within the premises. The sound system would be incorporated as part of the building alterations enabling the use of more sophisticated built in limiters. These would be set up and controlled purely by Gap Bluff Hospitality P/L. We note the presence of the existing internal plaques in the Armoury Building providing internal limits of 85 dB(A) Leq. It is recommended that this limit not be exceeded for the Officers Mess building.

- Service vehicle deliveries, bottle and Garbage collection will be limited to the daytime hours only. Where it is necessary to collect rubbish and bottles immediately on cessation of a night time function this will be carried out entirely within the building, with windows and doors closed. Disposal to external bins will not occur during the night time hours.
- Night time function finishing times functions will be staggered where possible to minimise peak traffic and patron flows from the venues.
- Coaches awaiting patron pickup will not be permitted to idle for an extended period of time during the night time hours.
- There will be supervision of exiting patrons on completion of the function in order to ensure an orderly departure.
- The venue operation will be conducted in accordance Responsible Services of Alcohol Legislation to prevent unruly behaviour or loud voices

6.5 Vehicular noise impact

On-site parking details are discussed in a report prepared by Ason Group ref 0075r01v2 dated 5/6/2015. The report notes a potential demand for approximately 88 spaces for the Gap Bluff Precinct.

There are no on-site parking facilities for the Constables Cottage.

Noise sources from carparks typically include doors opening and closing, engines starting and arrival and departure. The existing car-parking areas are approximately 80 metres from the Cliff Road Residential area.

Preliminary calculations have been carried out based on the following vehicular noise data:

Start:	89 LwA
Door Close:	92 LwA
Drive off:	98 LwA
Drive 20 kph	93 LwA

Noise from traffic movement while on private property is normally calculated within a 15 minute duration and compared with the Industrial Noise Policy criteria. The number of cars departing within the 15 minute period will also affect the overall noise levels. We have assumed that not all of the potential 88 vehicles would depart in the 15 minute period. Instead it is assumed that they would depart over a 1 hour period, equating to 22 over a 15 minute period.

On this basis a noise level of the order of 43 dB(A) $L_{AEQ(15\ minutes)}$ could be expected at the nearest residential properties due to 22 cars departing over a 15 minute period. While not a high level it is above the INP goal of 35 dB(A) at midnight, due to the low background noise at that time. This means that the car departure at this time may be audible. Some noisier cars may exceed the sleep disturbance criteria.

Noise mitigation measures may therefore become necessary in the event of an ongoing noise issue with traffic during the late night hour. These could include:

- Future late night measurement and audit of noise due to carpark access
- Supervision of the carpark areas to ensure an orderly and quiet departure
- Making good any defects in the carpark and access road surface in order to minimise wheel / road interaction noise. In the event of any future resurfacing, consider the use of open graded asphalt to minimise noise levels.
- Encourage access by a public transport or via a shuttle services provided by GAP Hospitality, as outlined in section 6.3 of the Ason Group report.

Noise from Traffic Flow on Public Roads

Once on public roads, traffic generated by the development is normally assessed using the EPA NSW Road Noise Policy (RNP). This aims to identify strategies that address the issue of road traffic noise from vehicles on public roads, including new traffic-generating developments.

For existing residences affected by additional traffic on existing local roads generated by land use developments Table 3 of the RNP specifies the following external criteria:

Period	Assessment criteria – dB(A)
Day – Leq(1hr)	55
Night – Leq(1hr)	50

Table 15 Road Noise Policy criteria for residential receivers

Section 3.4 of the RNP notes that where the existing traffic noise levels from a road are already above the noise assessment criteria (in the tables above) an increase of up to 2dB represents a minor impact that is considered barely perceptible to the average person.

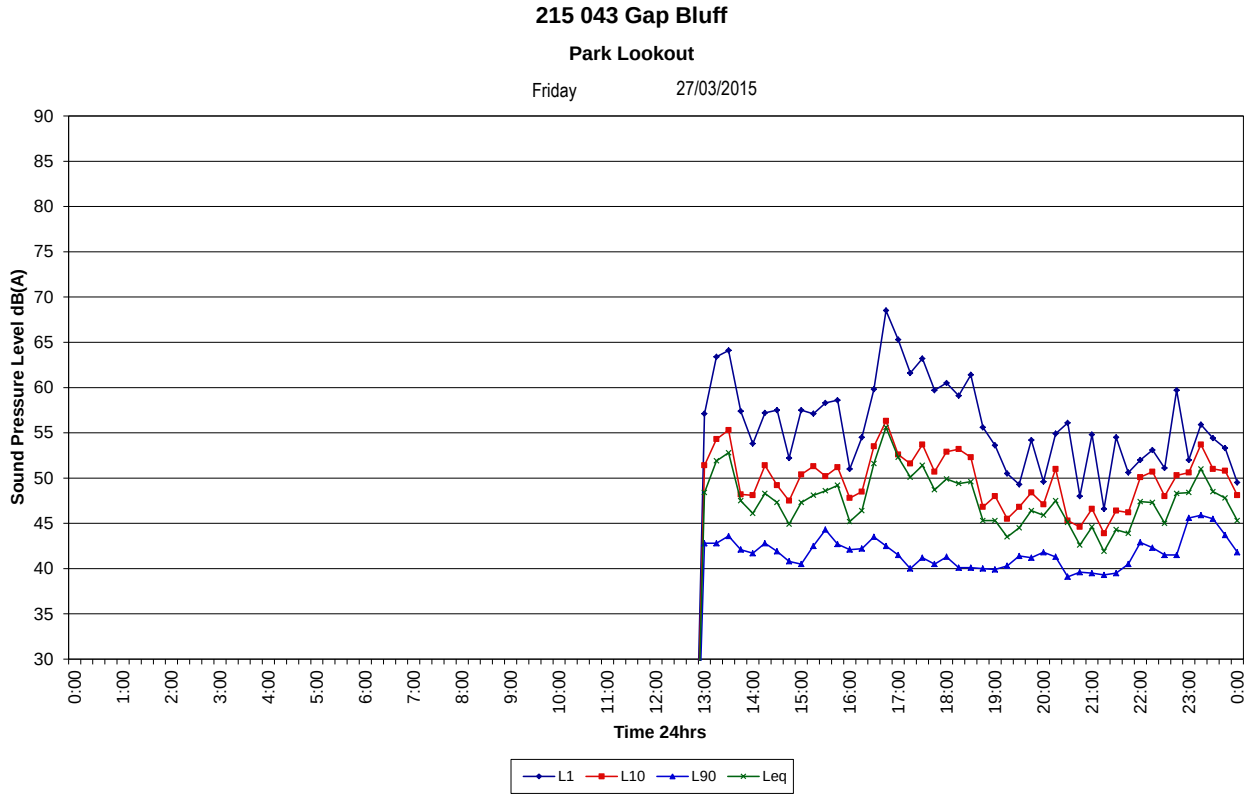
Compliance with the suggested RNP criteria will depend on existing and expected traffic flow specifics.

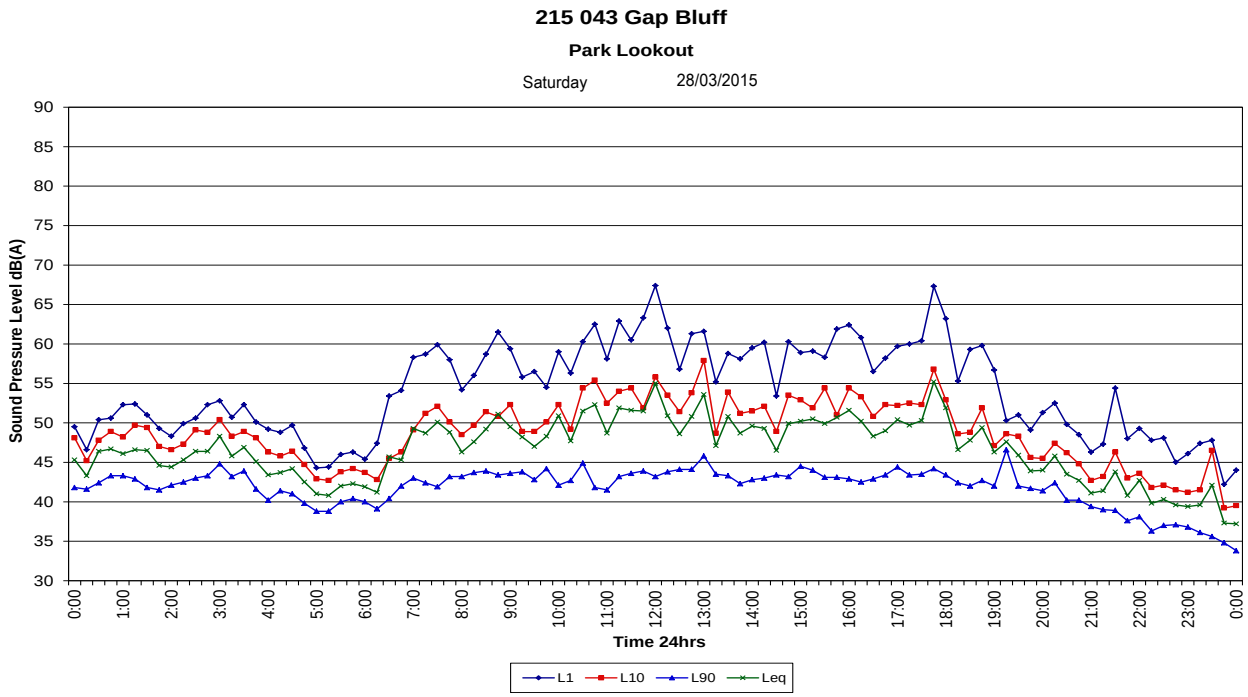
Figure 7 of the Ason Group Report indicates that are currently approximately 25-50 vehicle movements per hour during the 11pm to 12.30am period. Assuming 70 vehicles depart over a 1 hour period this would equate to an approximate noise increase of 3-5 dB(A) compared to that from existing traffic flow.

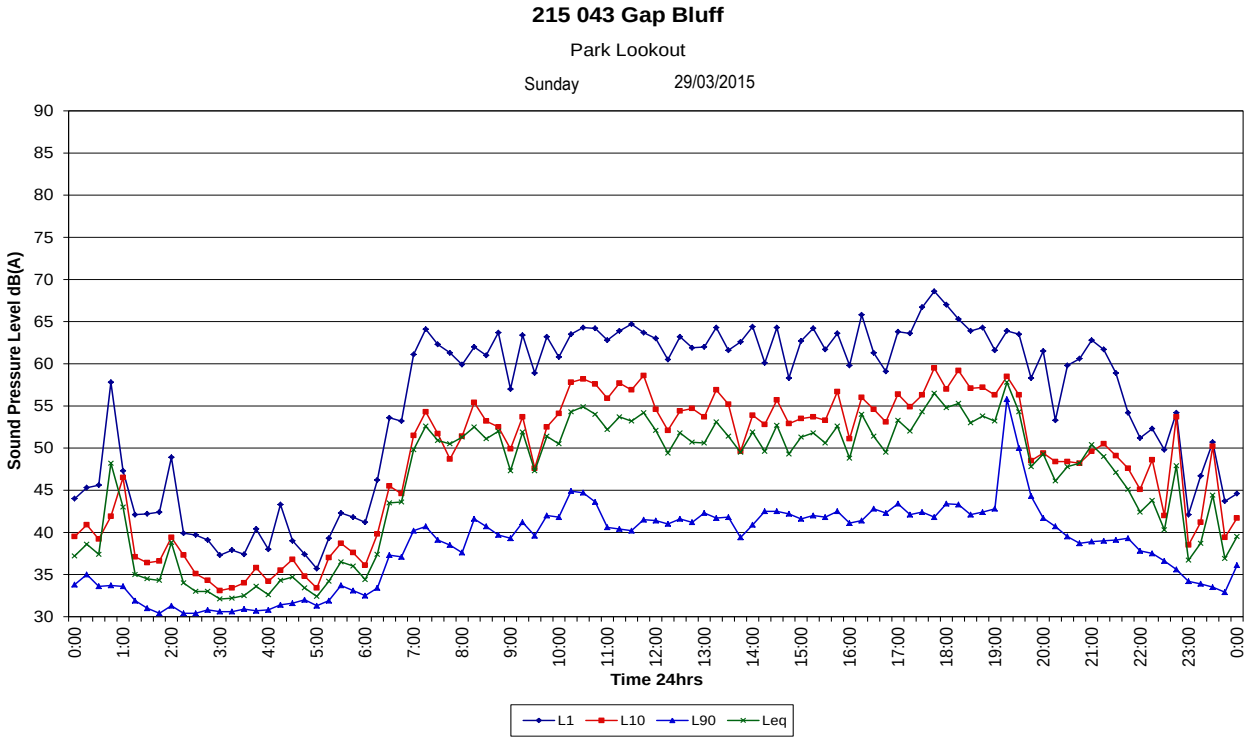
It is s expected that compliance would be achieved at the residential properties to the North West of the main exit point, however higher noise levels may impact residential properties closer to the immediate traffic flow.

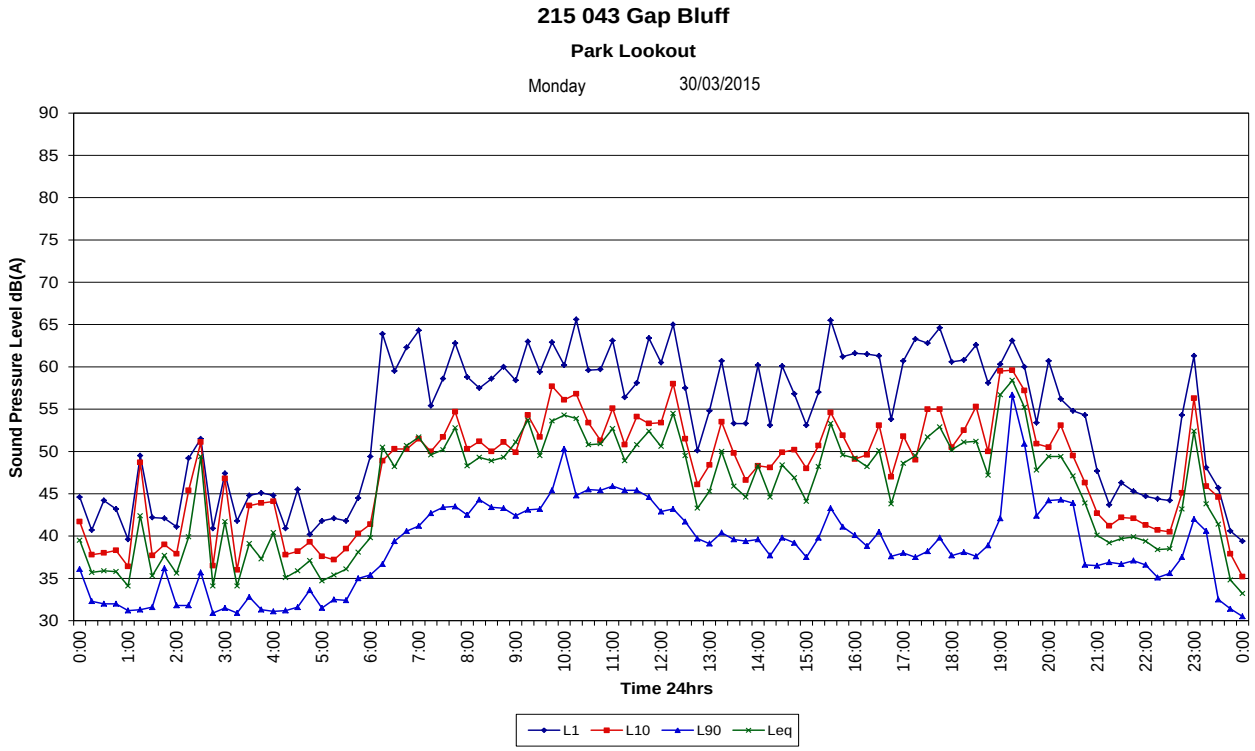
APPENDIX A – NOISE LOGGER DATA

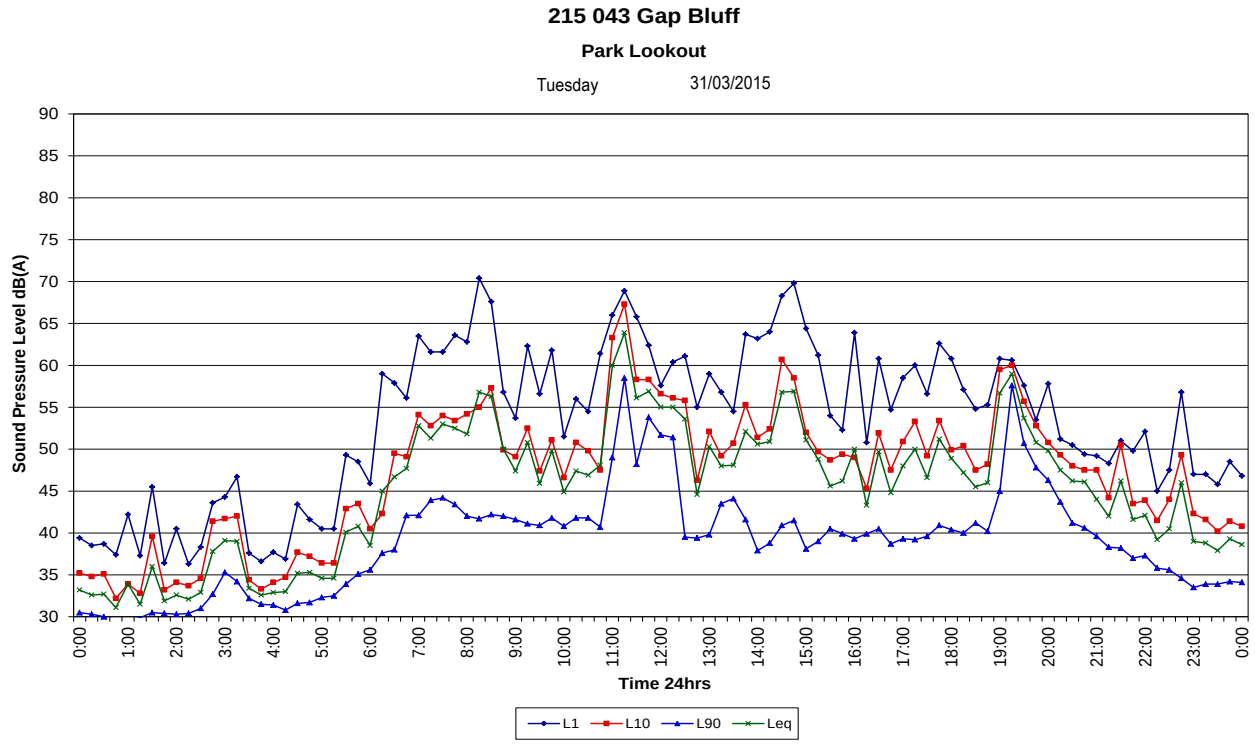
1- Noise data for Cliff Street location opposite 5-7 Cliff Street are presented as flows:

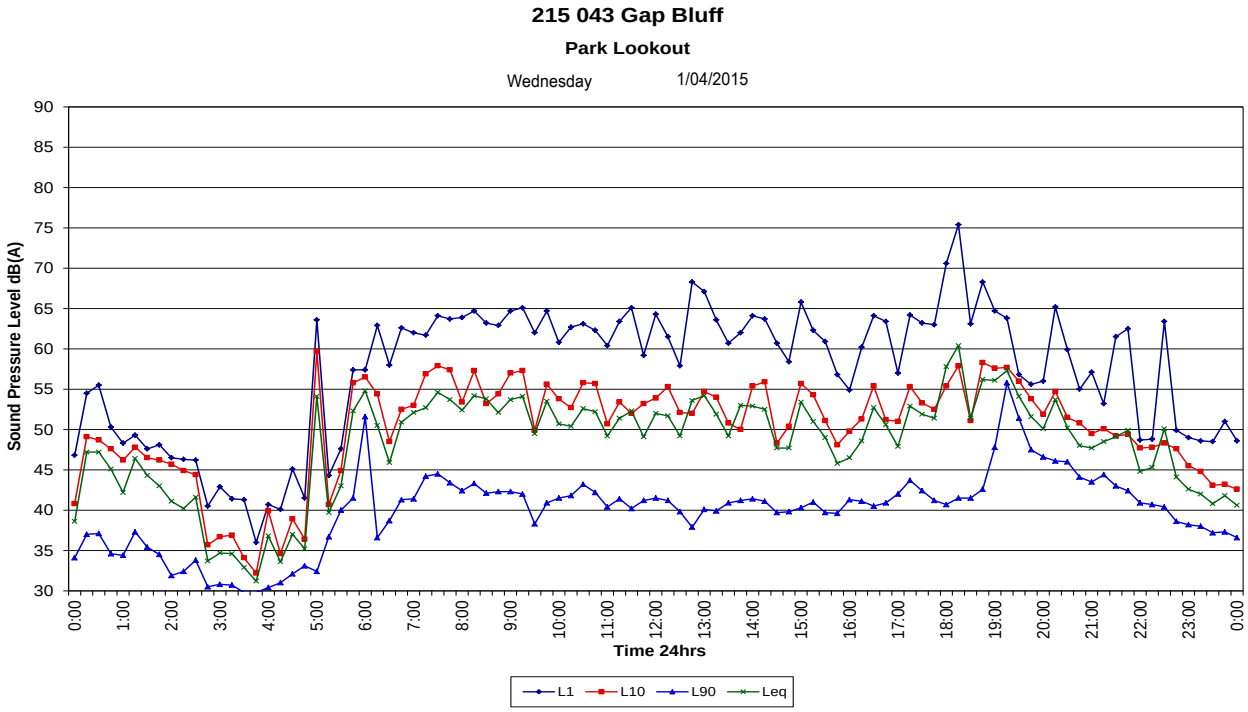


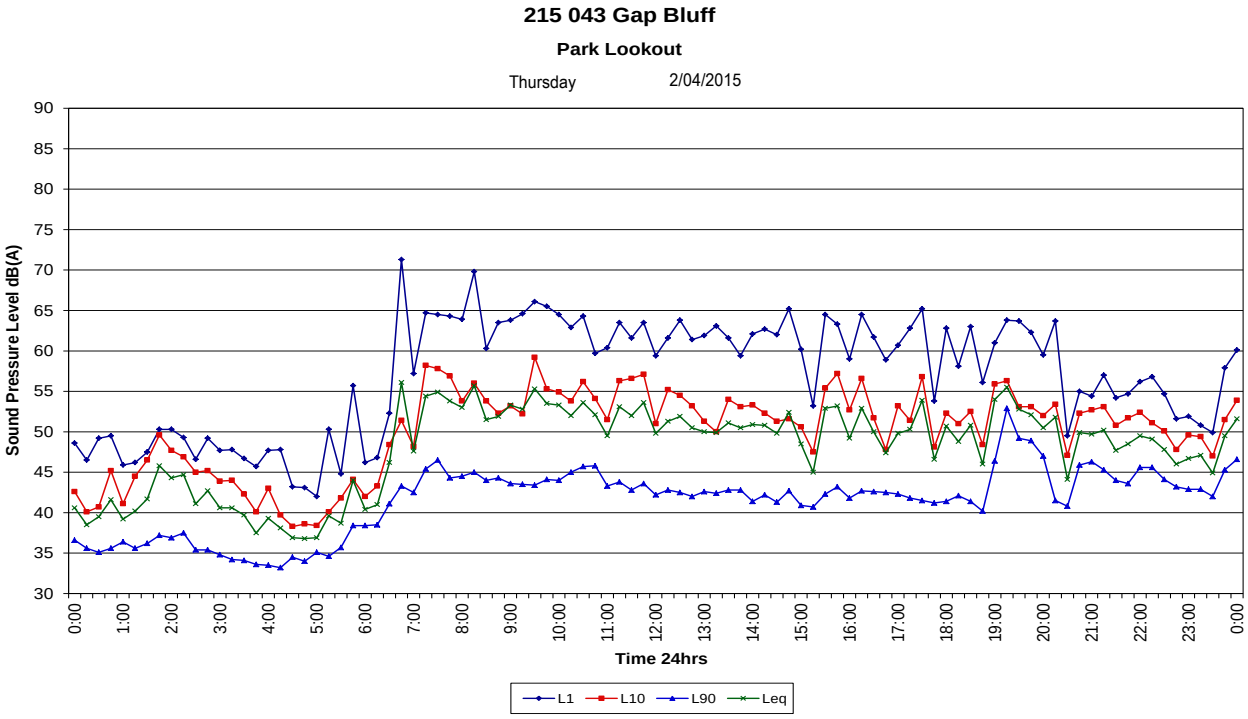

215 043 Gap Bluff
Park Lookout
Saturday 28/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq

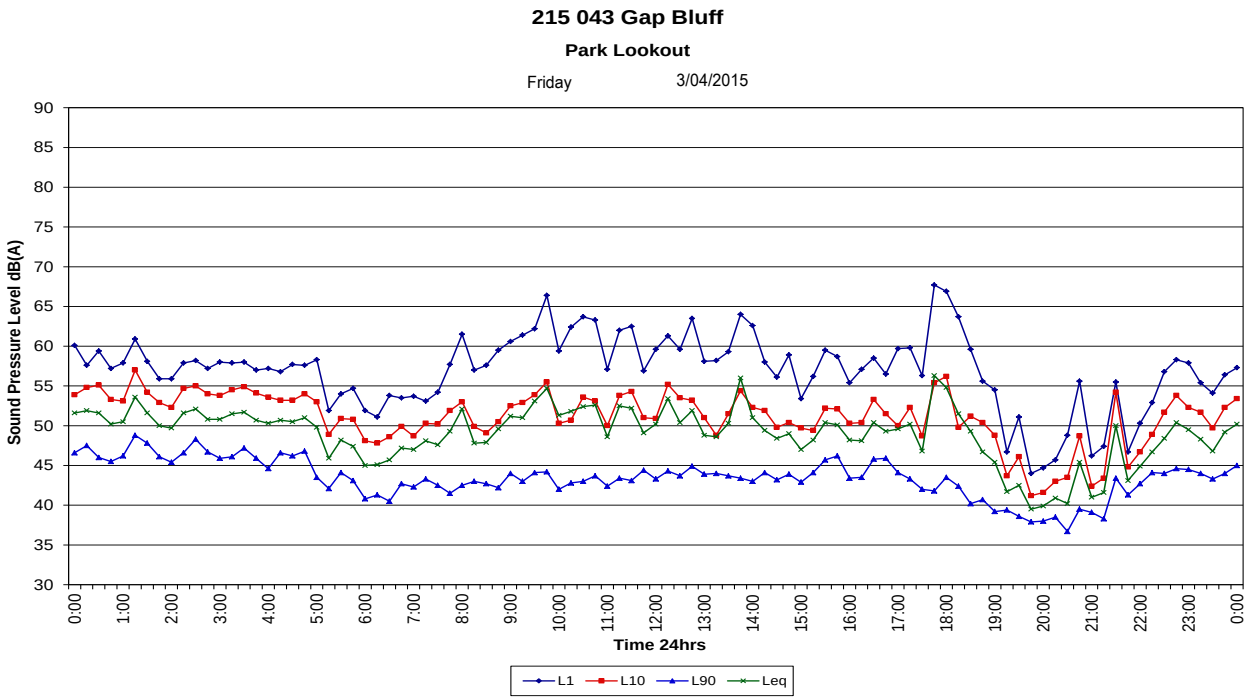

215 043 Gap Bluff
Park Lookout
Sunday 29/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Park Lookout
Monday 30/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


215 043 Gap Bluff
Park Lookout
Tuesday 31/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


215 043 Gap Bluff
Park Lookout
Wednesday 1/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Park Lookout
Thursday 2/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq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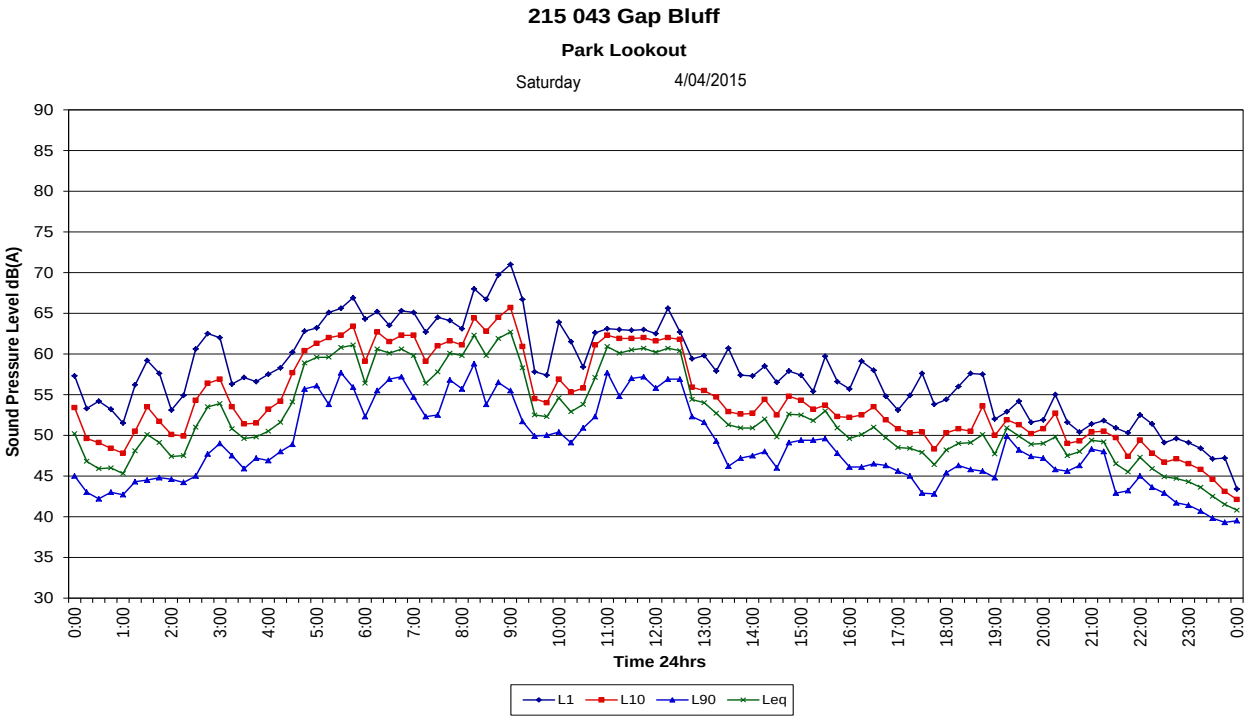
Park Lookout
Friday 3/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq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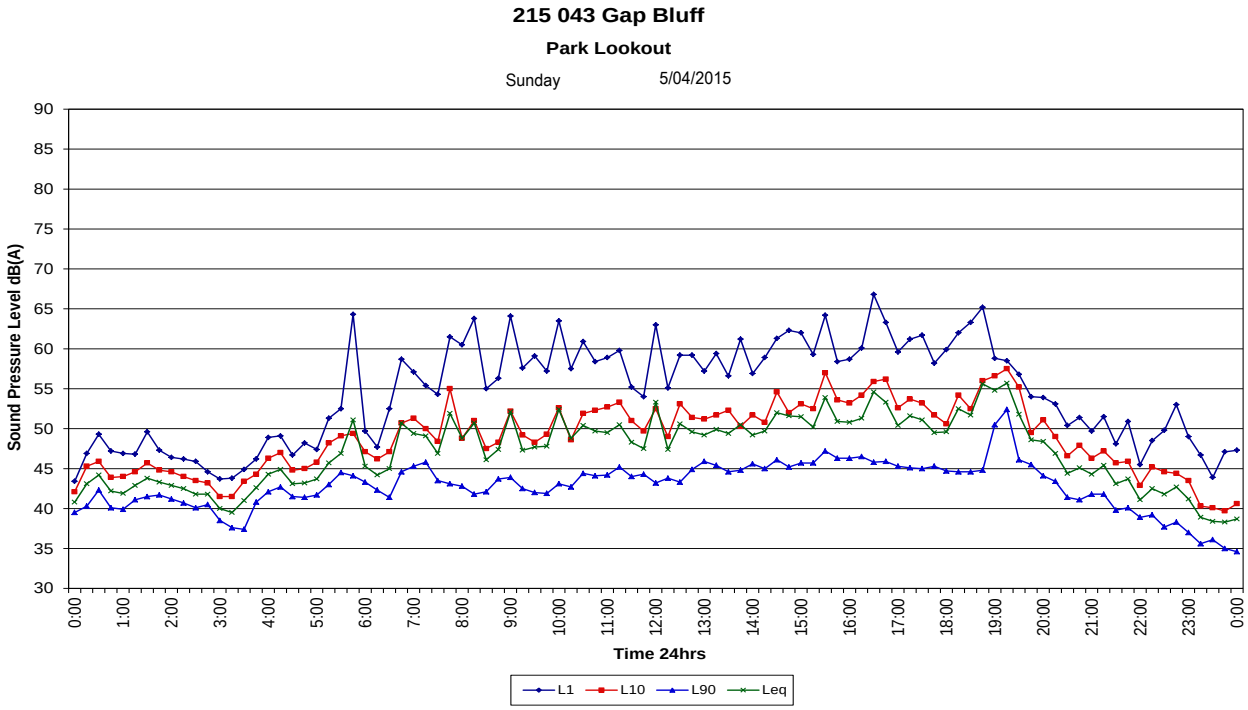
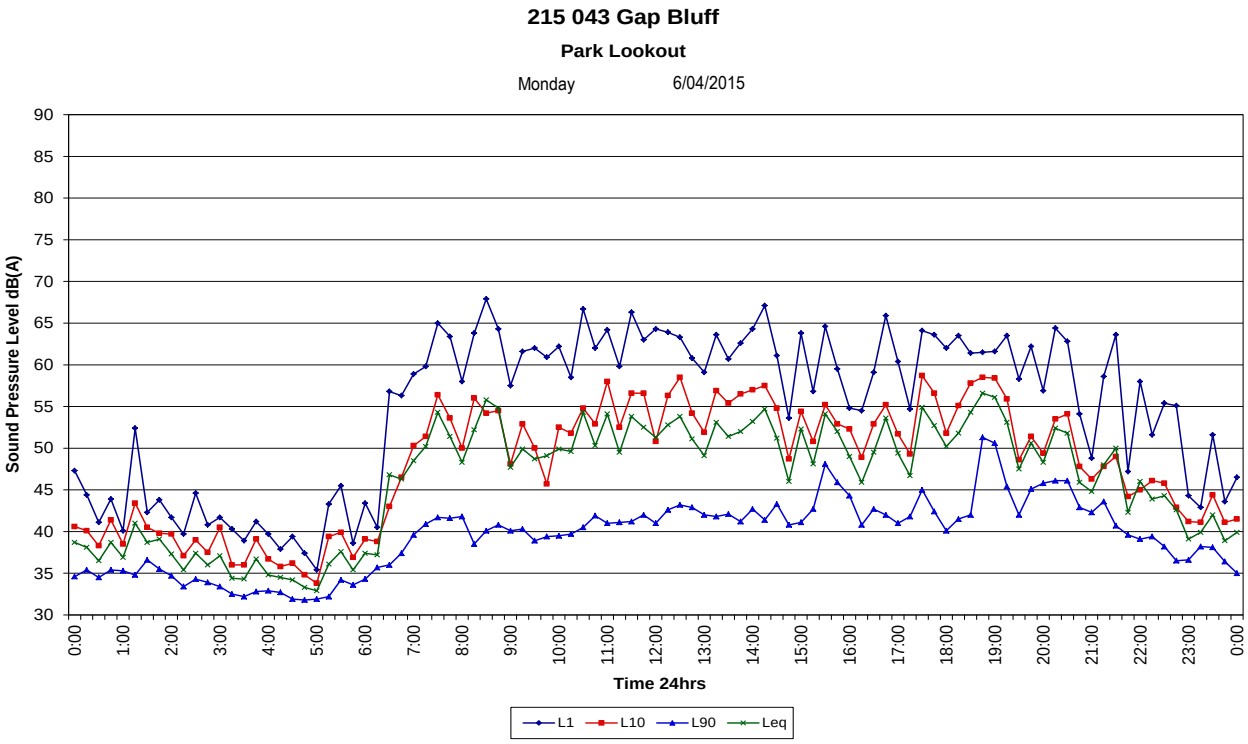
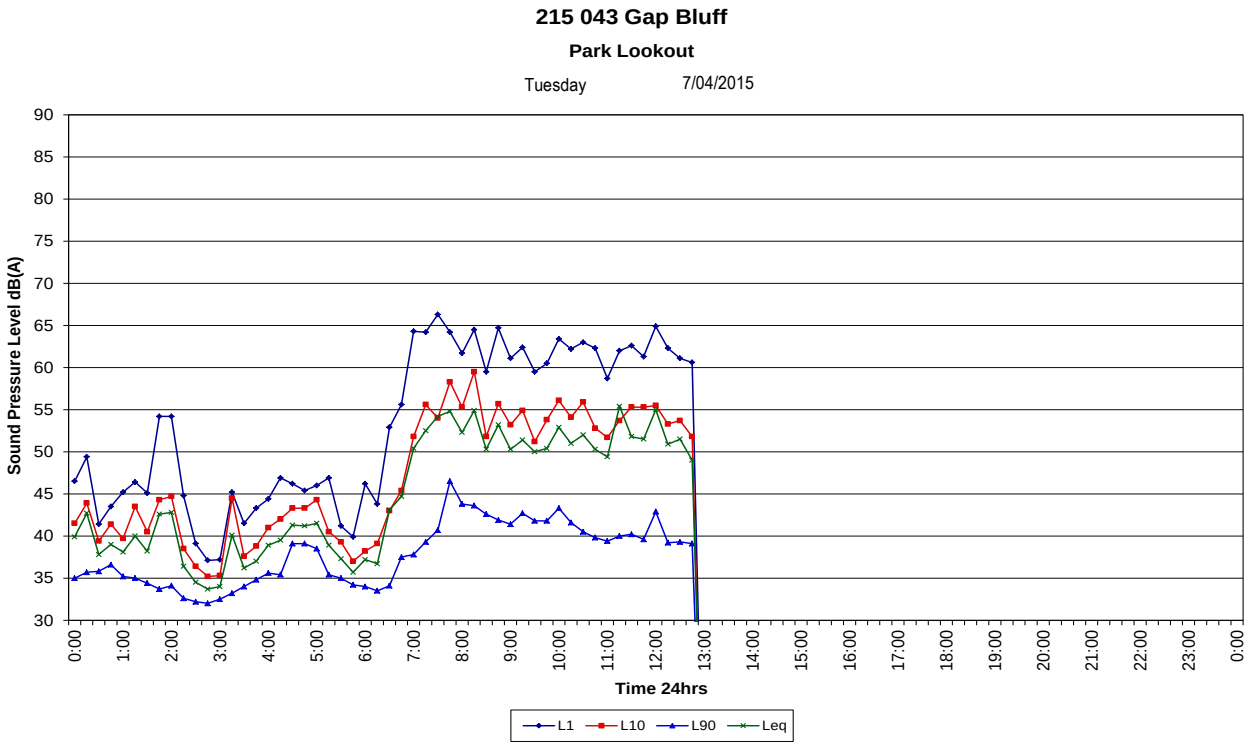
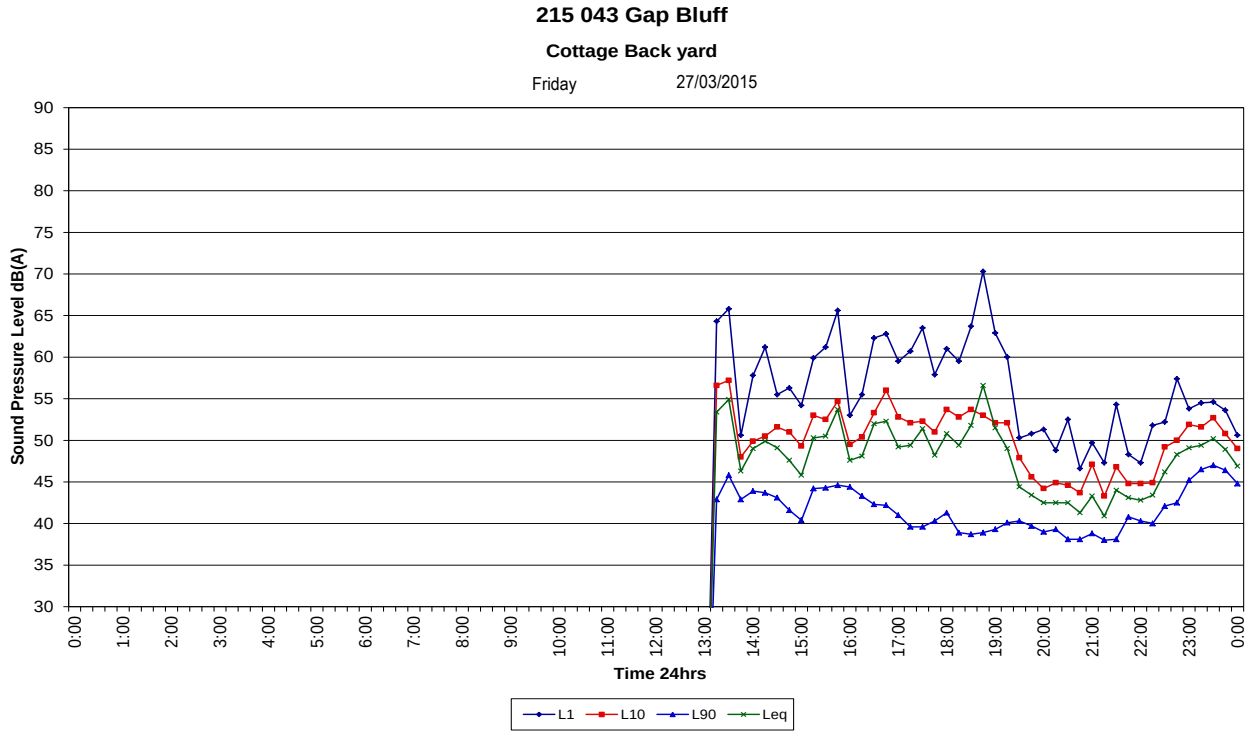
Park Lookout
Saturday 4/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq

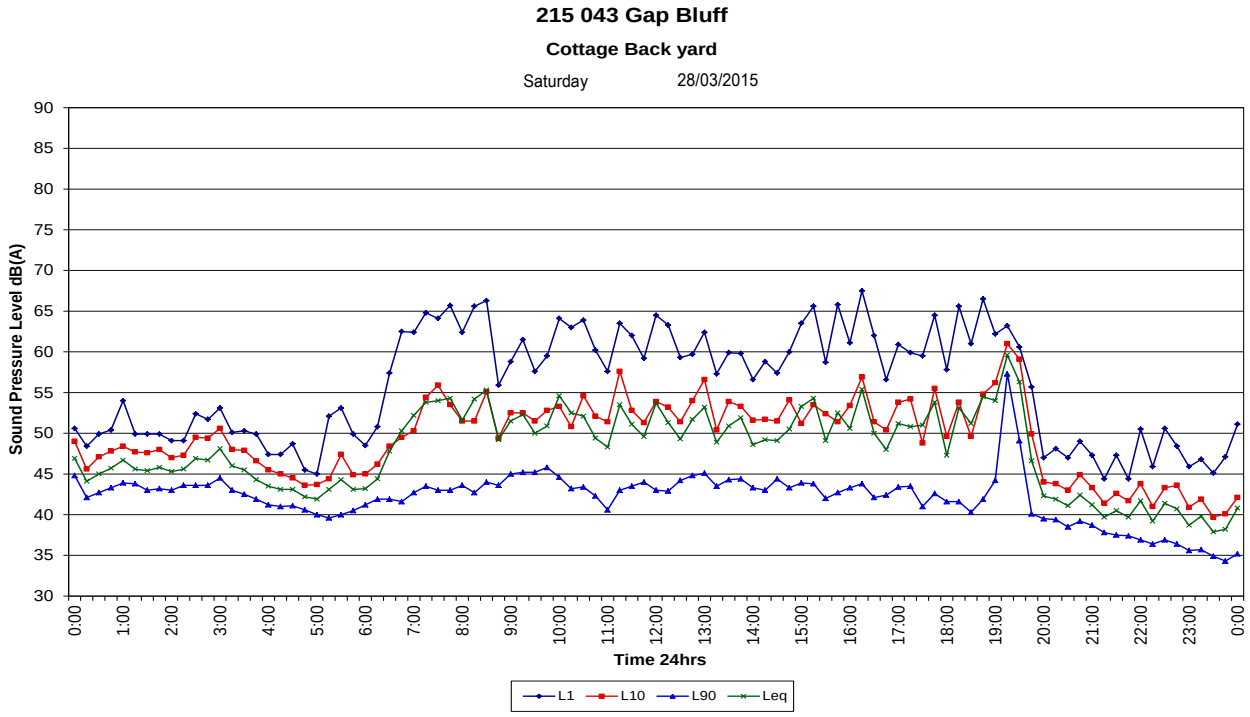

215 043 Gap Bluff
Park Lookout
Sunday 5/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq

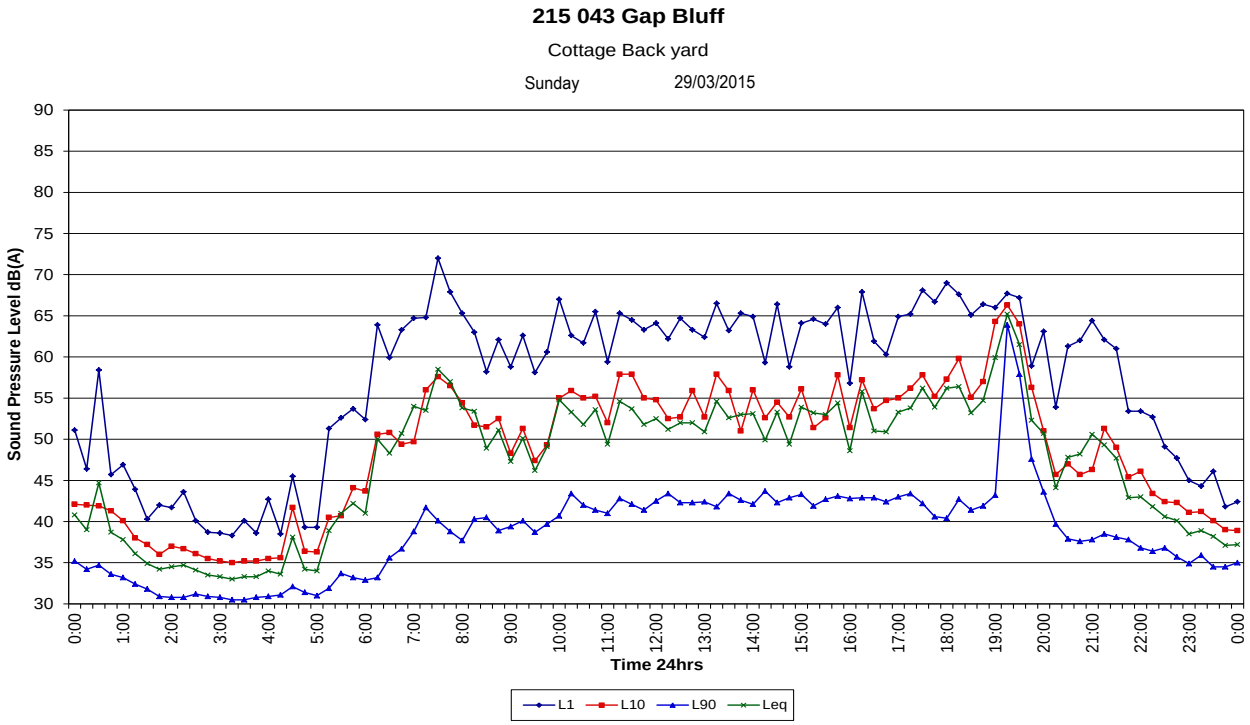

215 043 Gap Bluff
Park Lookout
Monday 6/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq

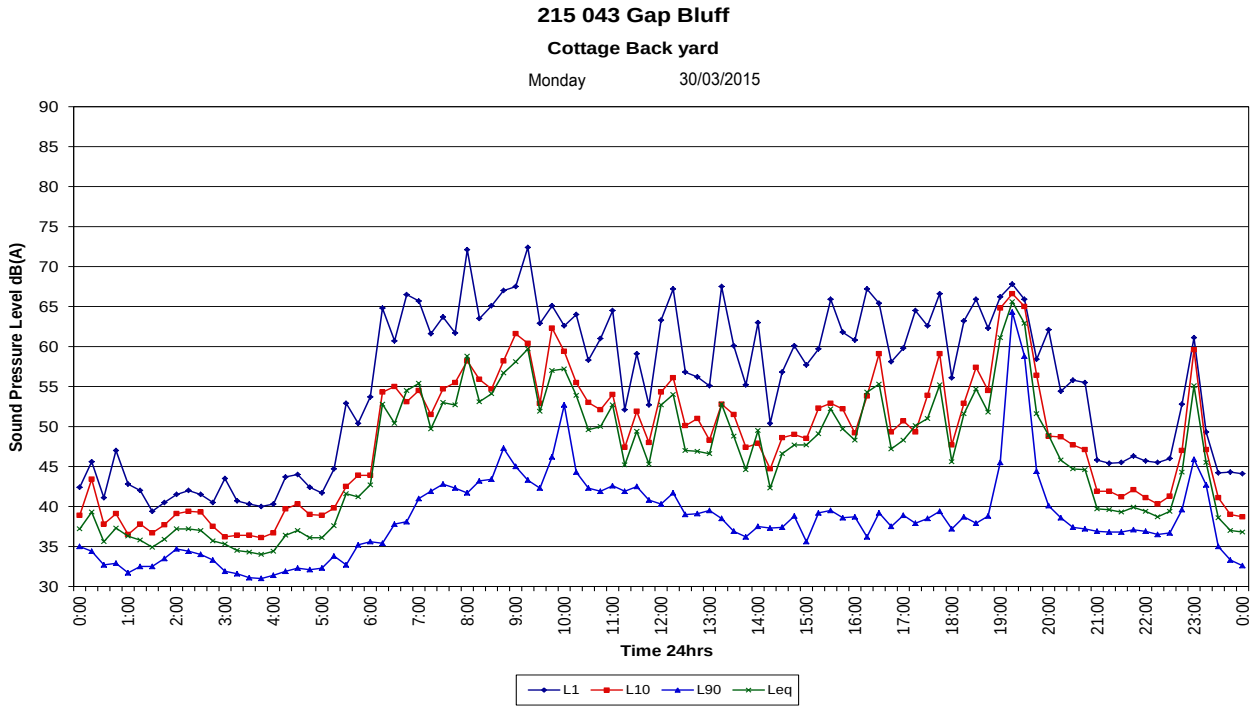


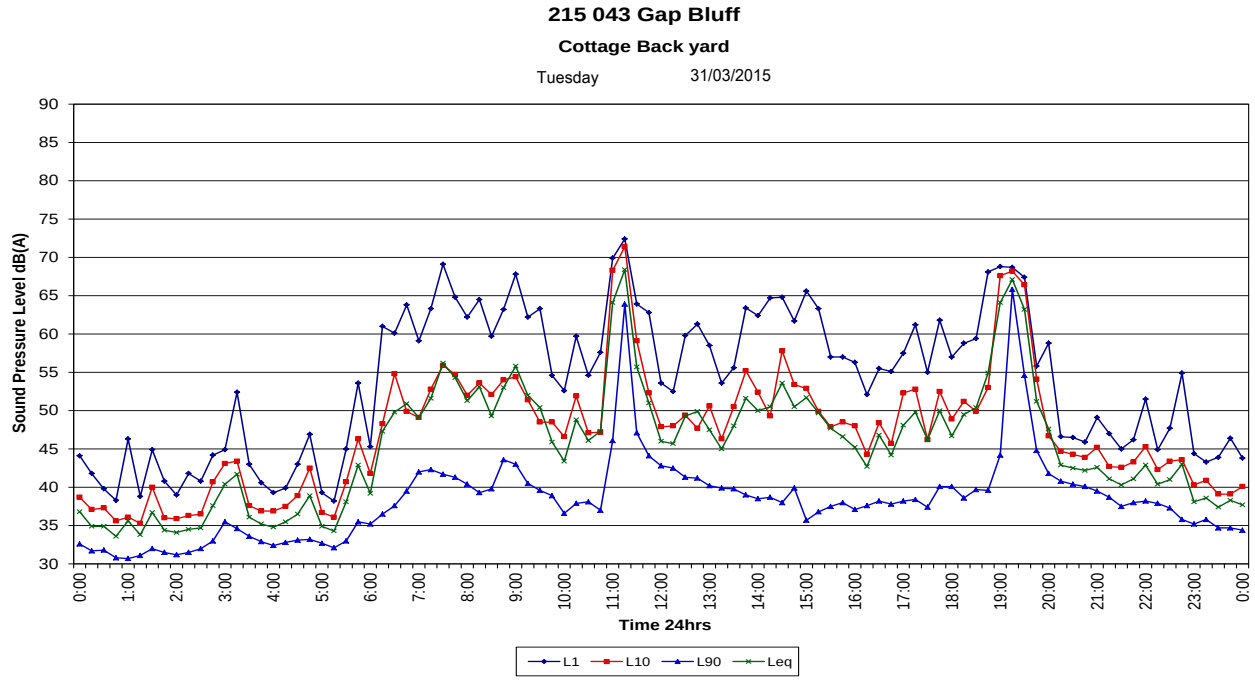
2- Noise data for the cottage location close to 1 Victoria Street are presented as flows:

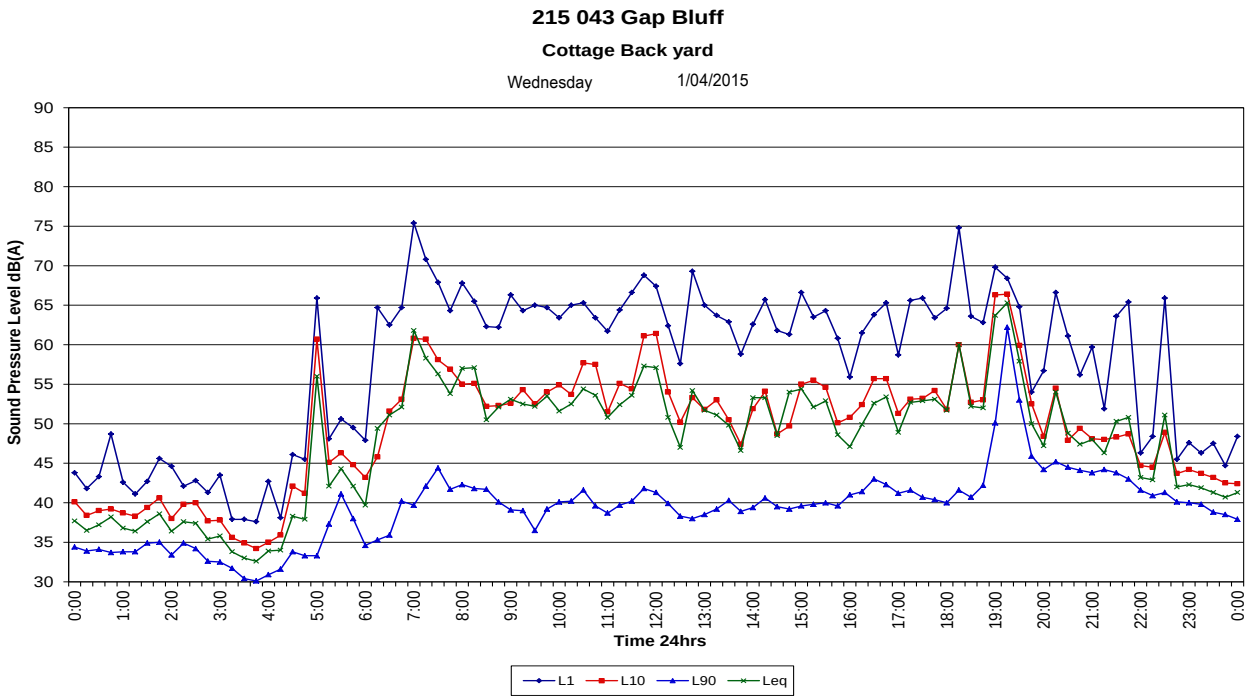



215 043 Gap Bluff
Cottage Back yard
Saturday 28/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Cottage Back yard
Sunday 29/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Cottage Back yard
Monday 30/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Cottage Back yard
Tuesday 31/03/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq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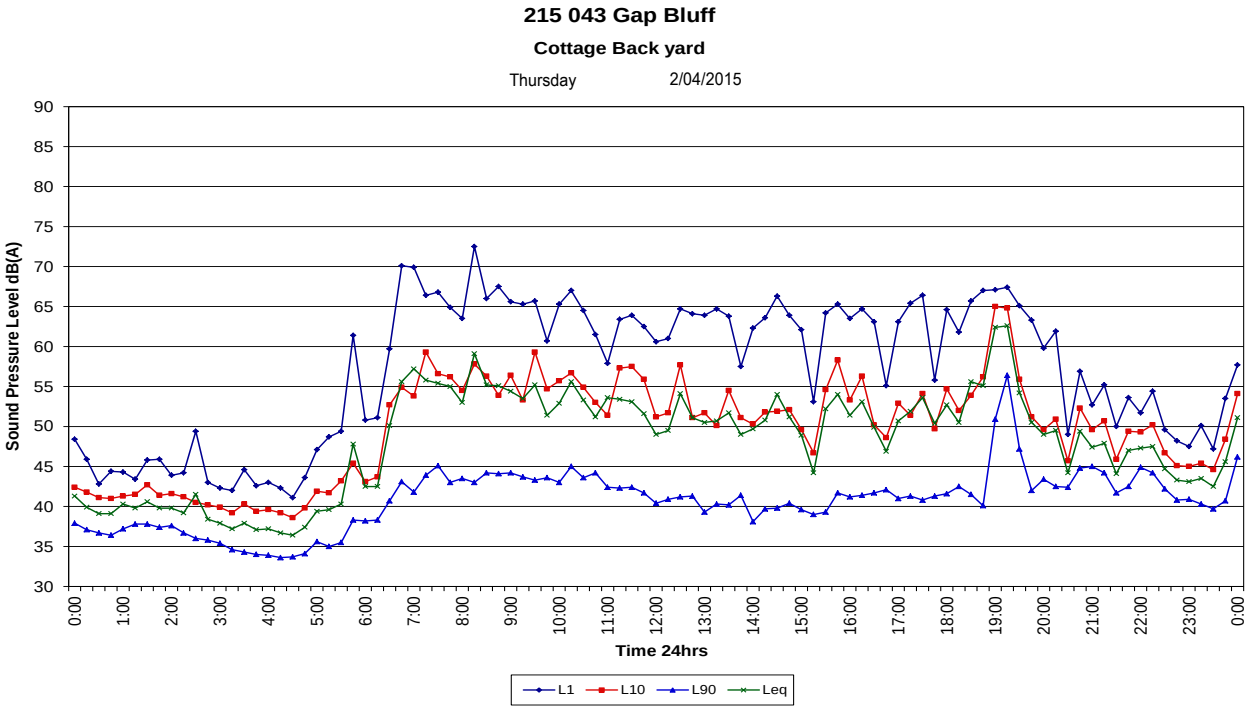
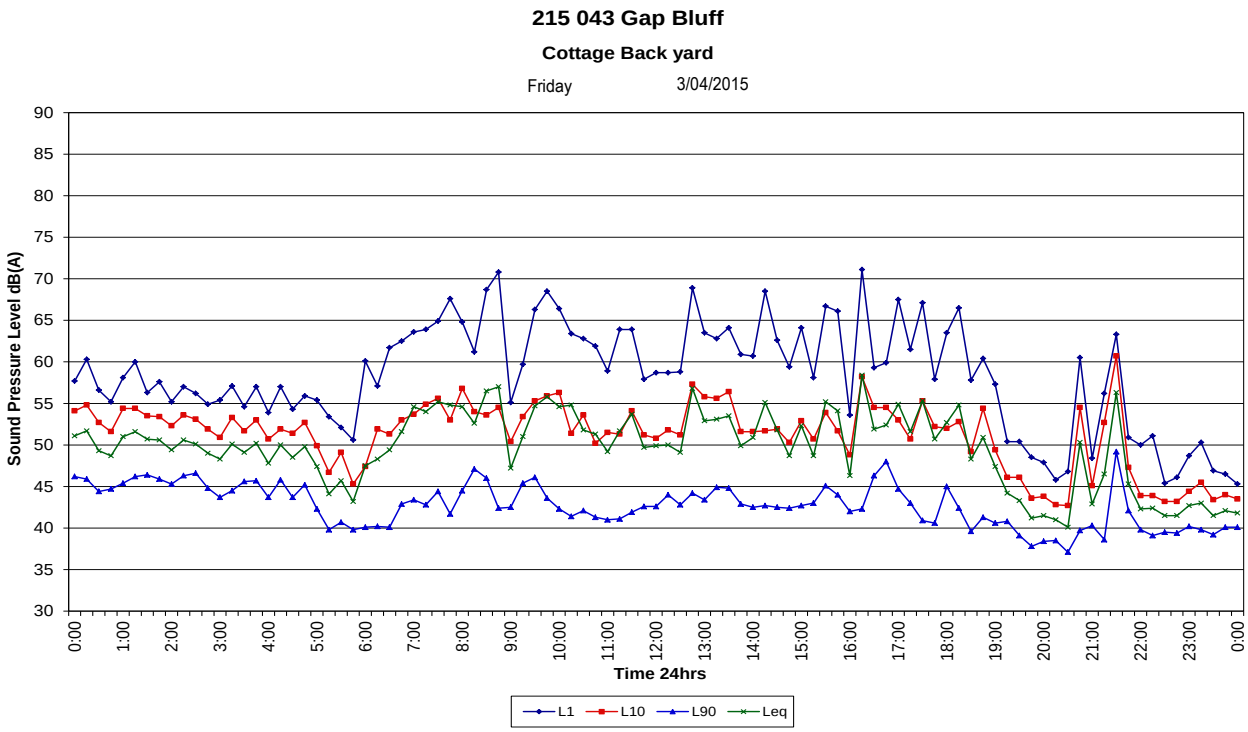
Cottage Back yard
Wednesday 1/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Cottage Back yard
Thursday 2/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq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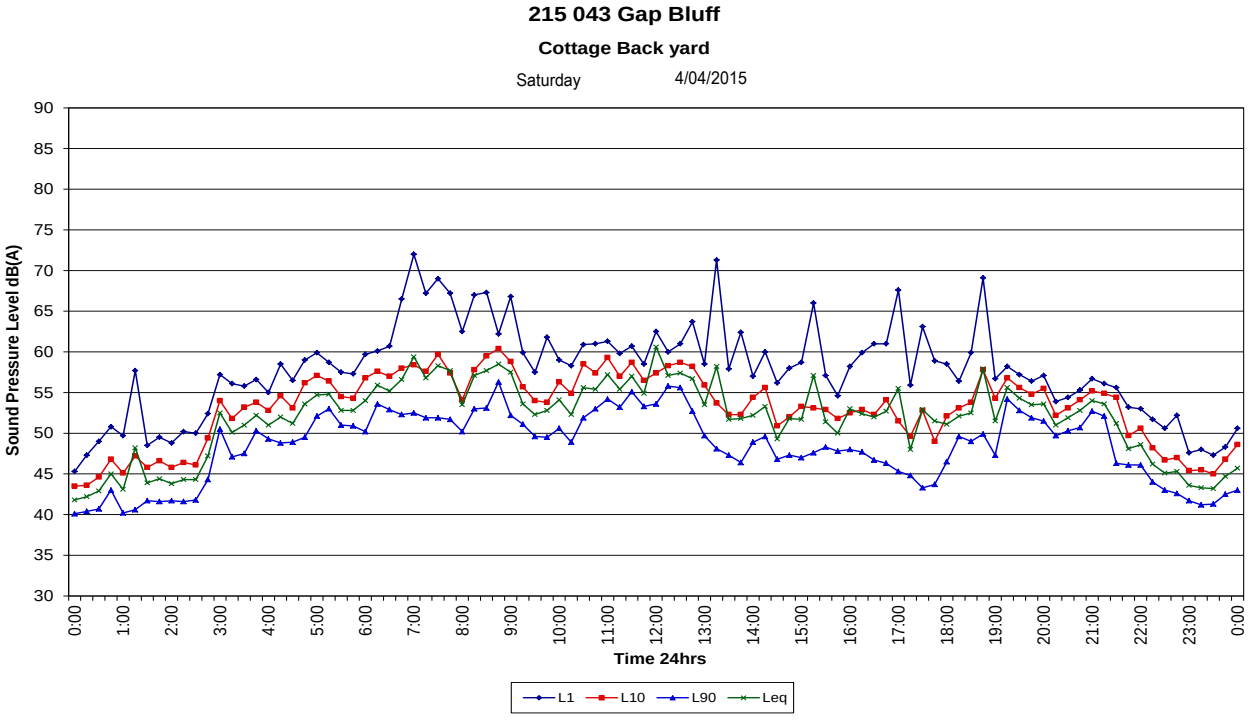
Cottage Back yard
Friday 3/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq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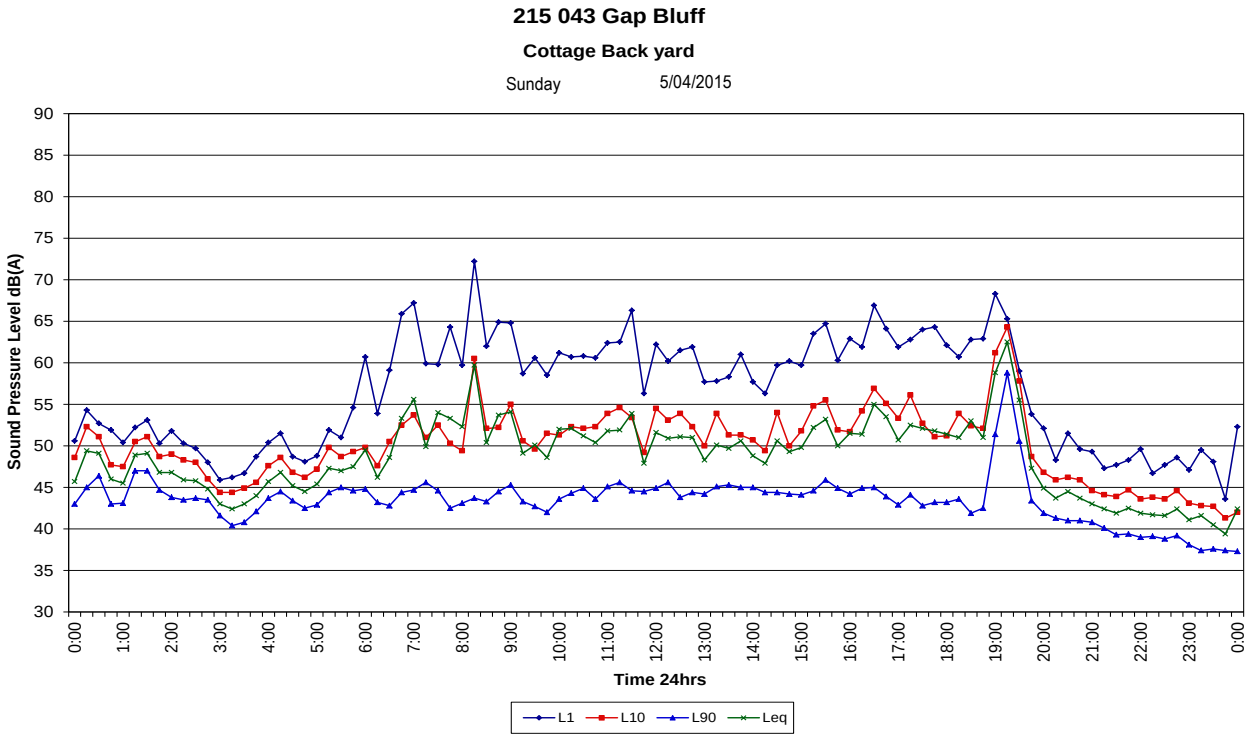
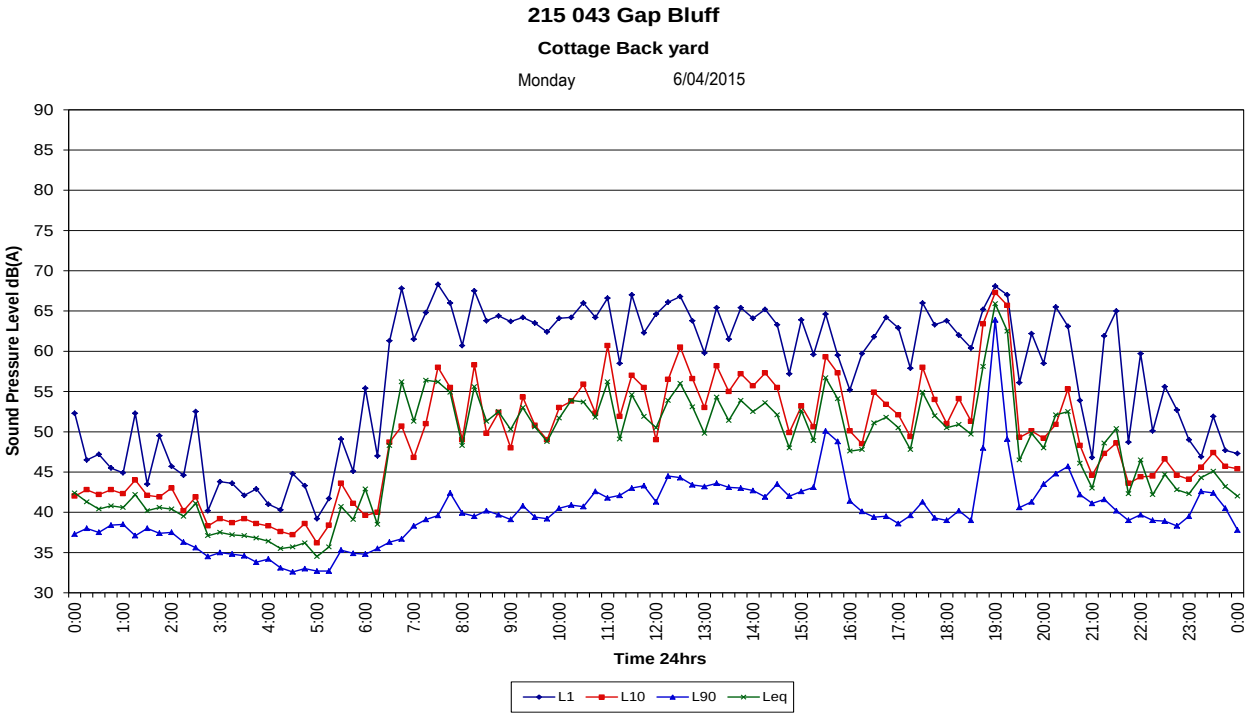
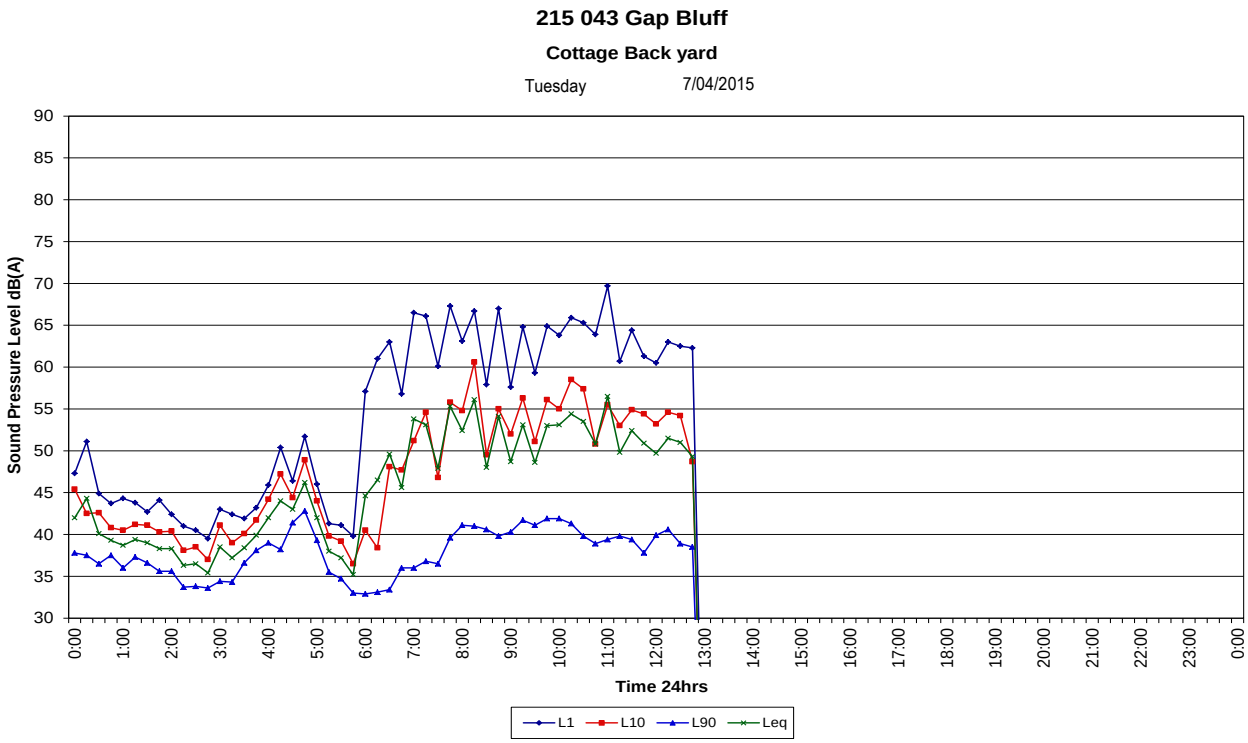
Cottage Back yard
Saturday 4/04/2015
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
L90
Leq


215 043 Gap Bluff
Cottage Back yard
Sunday 5/04/2015
Sound Pressure Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Time 24hrs
L1 L10 L90 Leq


215 043 Gap Bluff
Cottage Back yard
Monday 6/04/2015
Sound Pressure Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Time 24hrs
L1 L10 L90 Leq


215 043 Gap Bluff
Cottage Back yard
Tuesday
7/04/2015
Sound Pressure Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time 24hrs
L1
L10
L90
Leq

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PO BOX 345, LANE COVE, NSW, 1595 SUITE 12, 401 PACIFIC HIGHWAY ARTARMON 2064
Tel 612 9460 6824 Fax 612 9460 6823 admin@pka.com.au