North Byron Parklands

Response to Submissions

MP09_0028 Modification 3 – Lodged May 2015

Appendix D – Acoustic Management Addendum Report

October 2015

Appendix D – Acoustic Management Addendum Report

Air Noise Environment
Environmental Monitoring and Assessment

Review of Noise Limits -
Addendum - Final

North Byron Parklands Pty Ltd

September 2015

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03				
04				
05				
06				
07				
08				
09				

Table of Contents

Index of Tables

Index of Figures

1 Introduction

1.1 Overview

Air Noise Environment Pty Ltd were commissioned by North Byron Parklands (Parklands) to prepare a an acoustic report identifying the need and scope for amended noise limits for outdoor entertainment events held at Parklands[1]. Specifically, the report responded to recommendations provided by Air Noise Environment following the Splendour in the Grass 2014 (SITG 2014) event and supported the application for amendment of the existing conditions of approval to implement the following amended noise limits:

> *Controls established by the event are adequate to ensure that:*
>
> - *between 11am and midnight, the Music Noise Level when measured as:*
> - *L_{Aeq} over a 10 minute period at sensitive receivers must not exceed L_{Aeq} 65 dB(A); and*
> - *L_{eq} in the 63 hertz 1/1 octave band over a 10 minute period at sensitive receivers must not exceed $L_{eq,63\ Hertz}$ 75 dB(A).*
> - *between midnight and 2am, the Music Noise Level when measured as:*
> - *L_{Aeq} over a 10 minute period at sensitive receivers must not exceed L_{Aeq} 55 dB(A); and*
> - *L_{eq} in the 63 hertz 1/1 octave band over a 10 minute period at sensitive receivers must not exceed $L_{eq,63\ Hertz}$ 70 dB(A).*
> - *During periods of adverse meteorological conditions (including periods of strong winds or temperature inversion) an additional 5 dB allowance is added to the above noise limits. In these circumstances, the event is required to implement all reasonable and feasible acoustic controls to limit the potential impacts associated with event noise emissions.*

This addendum report supplements the information presented in the original review with information collected during the recent Splendour in the Grass 2015 (SITG 2015) event.

The report also considers whether there is potential to apply alternative noise limits lower than those previously recommended for receptors at greater distance from the venue. This has been undertaken due to a perceived risk that Parklands could enter into agreements with all nearby receptors in accordance with the conditions of approval, and thereby permit them to increase source noise emissions beyond those reasonably required in order to maintain the patron experience.

In view of this concern, and in the light of the additional information presented in this report, alternative noise limits are proposed to better respond to the sensitivities of nearby sensitive landuses.

1 Air Noise Environment Pty Ltd, Review of Noise Limits - FINAL, North Byron Parklands Pty Ltd, April 2015.

1.2 North Byron Parklands

North Byron Parklands is approved as an outdoor cultural event venue for a trial period of five years (to 31 December 2017), commencing with Splendour in the Grass 2013. Parklands is located in an area characterised by predominantly rural uses. Figure 1.1 below presents the location of Parklands and receptor locations that have been identified as representative of the broader community in the surroundings of the venue. To the east and south-east of the site is the Billinudgel Nature Reserve, an area of ecological significance.

Events held to date at Parklands typically involve music, arts, food, markets, cinema and speaking forums. These events vary in their hours of operation. Typically, music with live bands (main music source) operate between 11 am and midnight with quieter music (bars, cafes and dance floors) operating at other times.

Key noise sources at events held at Parklands include sound amplification equipment, power generation equipment, lighting equipment and event patrons. For event stages key noise sources include front of house speaker arrays, stage monitors and crowd noise. Of these, noise from the sound amplification equipment (front of house speaker arrays and stage monitors) are the most significant in terms of noise emissions.

Other sources of noise include music amplification equipment and crowd noise at bars, cafes, dance floors and food hall areas. Key noise sources at these areas are likely to be similar in character to those for the event stages, however noise emissions are typically significantly lower than those of the event stages.

Other ancillary noise sources involved with events at Parklands include noise from camping areas and traffic noise.

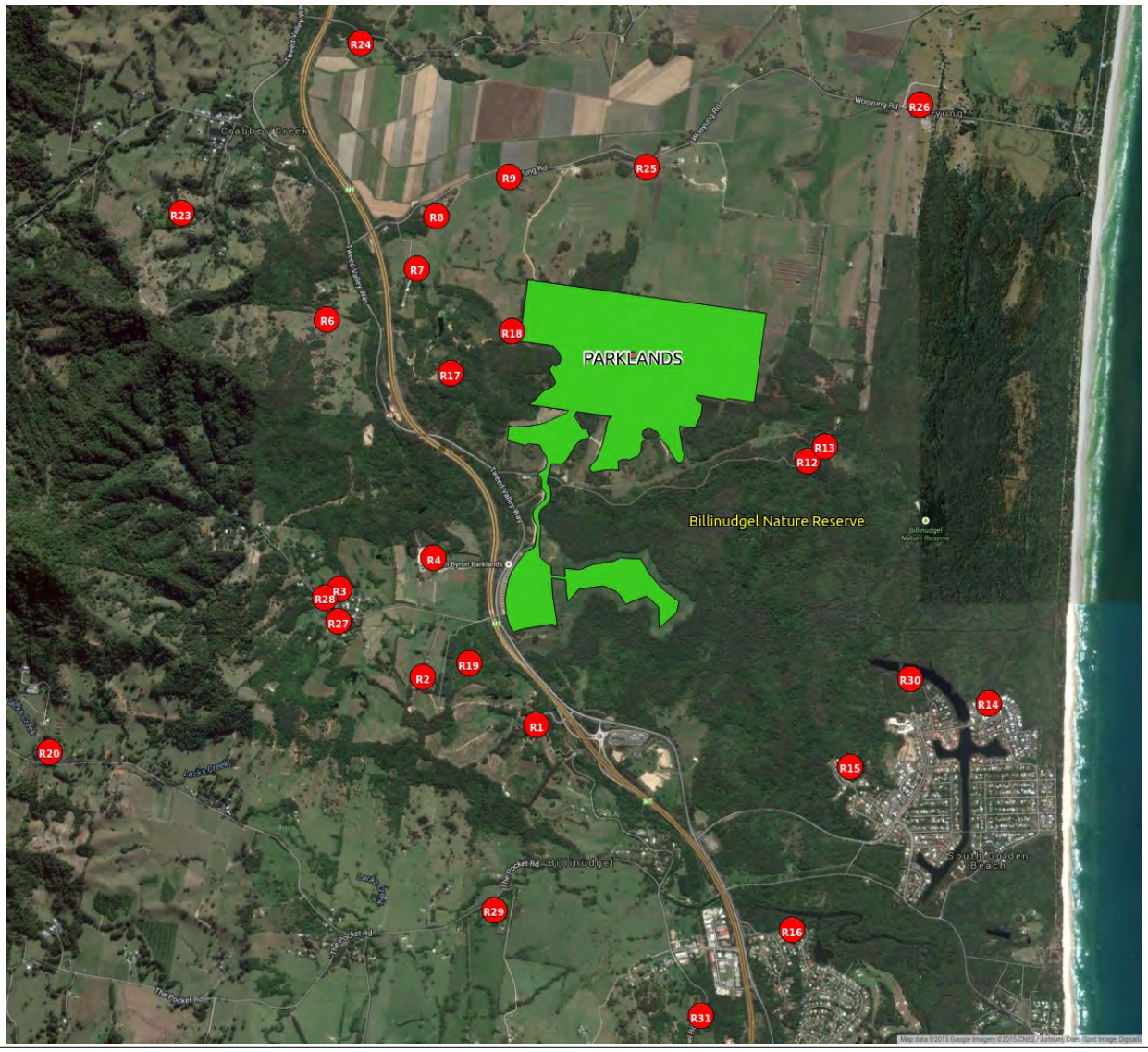

Figure 1.1: Site location and Representative Receptor Locations

1.3 Noise Sensitive Receptors

Table 1.1 and Figure 1.1 identify the receptor locations that have been identified for the purposes of representing noise sensitive receptors in the area surrounding the Parklands site.

Table 1.1: Representative Noise Sensitive Receptor Locations

Receptor ID [1.]	Address	Lot	Plan Number	Easting	Northing
R1	26 Billinudgel Road, Billinudgel	2	708466	550545	6848276
R2	25 Yelgun Road, Yelgun (L5)	2	590451	549809	6848586

Receptor ID [1.]	Address	Lot	Plan Number	Easting	Northing
R3	84 Yelgun Road, Yelgun (L6)	2	581144	549272	6849152
R4	44 Yelgun Road, Yelgun	2	856229	549885	6849350
R6	Pacific Highway, Yelgun	271	755687	549200	6850879
R7	Tweed Valley Way, Wooyung	122	1003400	549782	6851201
R8	72 Wooyung Road, Crabbes Creek	11	868148	549911	6851539
R9	210 Wooyung Road, Wooyung	1	359521	550382	6851787
R12	237 Jones Road, Wooyung (L3)	1	589613	552309	6849959
R13	251 Jones Road, Wooyung (L2)	2	589613	552423	6850053
R14	38 Mia Court, Ocean Shores	73	1036242	553475	6848405
R15	26 Flinders Way, Ocean Shores	15	1016444	552578	6848002
R16	111 Balemo Drive, Ocean Shores	852	240400	552197	6846959
R17	Pacific Highway, Wooyung	21	1034998	549997	6850529
R18	Pacific Highway, Wooyung	21	1034998	550399	6850795
R19	7 Yelgun Road, Yelgun	1	217025	550110	6848674
R20	242 Middle Pocker Road, Middle Pocket	1	597810	547389	6848120
R21	749 The Pocket Road, The Pocket	2	248142	545003	6846851
R22	56 Pimble Valley Road, Crabbes Creek	3	807334	545133	6851118
R23	60 Bluegum Court, Crabbes Creek	13	855550	548256	6851560
R24	44 Hulls Road, Crabbes Creek	126	1003400	549427	6852646
R25	210 Wooyung Road, Wooyung	1	748228	551275	6851844
R26	412 Wooyung Road, Wooyung	4	604748	553046	6852236
R27	93 Yelgun Road, Yelgun	7	717125	549266	6848944
R28	108 Yelgun Road, Yelgun	3	544291	549179	6849099

Receptor ID [1.]	Address	Lot	Plan Number	Easting	Northing
R29	175 The Pocket Road, Billinudgel	6	623865	550265	6847093
R30	39 Hardy Avenue, Ocean Shores	17	872205	552970	6848562
R31	101 The Tunnel Road, Billinudgel	1	952096	551603	6846410

1.4 This Report

This report presents the background, methodology and findings of the addendum report. An acoustic glossary is presented in Appendix A to assist the reader.

2 SITG 2015 Noise Monitoring

2.1 Introduction

Throughout SITG 2015, Air Noise Environment personnel undertook both attended and unattended noise monitoring in accordance with the approved Acoustic Monitoring Program[2]. This provided for continuous unattended noise monitoring at a total of 8 locations (including 5 residential receptor positions and 3 ecological monitoring locations).

In addition to the continuous unattended noise monitoring, attended monitoring was undertaken by 4 personnel between the hours of 11 am and 4 pm and 5 personnel from 4 pm through to 2 am each day of the event. It is noted that this represented an increased commitment by SITG 2015 to management of noise emissions from the venue over and above the 2 personnel required by the AMP. Attended noise monitoring was undertaken at sensitive receptor locations in the following manner:

- where no complaints were received noise monitoring was undertaken at the representative sensitive receptor locations identified in Table 1.1; and
- where complaints were received, attended noise monitoring was undertaken at that sensitive receptor subject to availability of the acoustic engineer;
- where complaints were received from multiple sensitive receptors over a short period of time, attended monitoring was either undertaken at each receptor premises (subject to availability of the acoustic engineer) or a location representative of these premises (in instances where premises were in reasonable proximity to each other).

Overall, across the four days of the event, a total of 296 attended noise measurements of 10 minute duration were made by Air Noise Environment personnel. Of these, a total of 42 measurements were made in response to noise complaints received by Parklands, with the remainder undertaken as part of the management of noise emissions from the event.

2.2 Key Findings of Monitoring

2.2.1 Low Frequency Noise

2.2.1.1 Receptors Near To Parklands

Figure 2.1 presents a summary of the maximum measured $L_{eq,63\ Hertz}$ (dB) at each of the receptor locations at which low frequency noise from the event was audible during the attended noise monitoring.

At receptors within 1 km of the Parklands venue, the results of the monitoring confirm that compliance with the recommended alternative noise limits was observed for all receptors with the exception of four measurements for receptors R25, R18 (two measurements) and R4. Of these

2 Air Noise Environment Pty Ltd (14 July 2015) 'Acoustic Monitoring Program – Splendour in the Grass 2015 – Final' prepared on behalf of Splendour in the Grass Pty Ltd.

receptors, both receptor R25 and R18 have entered into agreements with Parklands and are therefore not considered to be sensitive receptors for the purposes of assessing compliance.

Investigation of the specific conditions influencing the occurrence of the remaining measured exceedence has been undertaken, in order to determine whether there were contributing factors which could have been managed by the event. More detailed review of the results of the attended noise monitoring at the time of the exceedence at Receptor R4 confirms that this level was measured on Sunday evening at approximately 7:20 pm. At this time, Royal Blood was performing on the Amphitheatre stage. During this act a number of elevated noise levels were measured at receptors to the south-west, south-east and north of the venue. Review of the noise levels measured at the front of house position throughout the act confirmed that levels had not changed significantly from previous acts. Upon observation of the elevated levels, monitoring personnel contacted the production team to reduce stage levels and noise levels remained within the recommended noise levels for the remainder of the event. The identification and subsequent management of the noise emissions is in accordance with the requirements of the approved AMP, and demonstrates the pro-active approach to management of noise emissions from the site.

2.2.1.2 Receptors Beyond 1 Km From Parklands

At distances of more than 1 km from Parklands, review of the measured noise levels presented in Figure 2.1 indicates that $L_{eq,oct(63Hz)}$ noise levels remained below or equal to 70 dB at all times with the exception of two locations to the south of the venue (in Yelgun and Ocean Shores).

Of these, the measured 72 dB level observed in Yelgun (south-west of the venue) is noted to have occurred on Thursday evening (23 July 2015). At this time, the main event stages were not operational with only the bars and cafes operating. The measured noise levels are understood to have been the result of the operation of amplified entertainment noise from a number of these bars. Given this, it is expected that, with improved management of noise from these venues, levels of greater than 70 dB can be prevented from occurring for future events.

The level of 72 dB observed in Ocean Shores was measured at the north-western corner of the suburb on elevated terrain on the Sunday evening at approximately 7:30 pm. As noted previously, Royal Blood was performing on the Amphitheatre stage at this time, and elevated noise levels were also measured at other monitoring positions at the same time. As a result, monitoring personnel contacted the production team to reduce stage levels and noise levels in excess of 70 dB were not observed for the remainder of the event. This response is consistent with the requirements of the approved AMP and as such is considered to be an indication of the effective management of noise emissions from the site.

2.2.1.3 Conclusions – Low Frequency Noise

The two elevated levels measured at receptors > 1 km from Parklands either resulted from the operation of event sources other than the main event stages or were otherwise controlled through the active noise management of the event. Given this, it is expected that, at distances beyond 1 km

from the venue, a lower noise limit could reasonably be applied to provide more certainty for residences in this area. It is therefore recommended that different noise limits are applied for both Zones 1 and 2 as marked on Figure 2.2 as follows:

Controls established by the event are adequate to ensure that:

- *between 11 am and midnight, the Music Noise Level when measured as:*
  - *L_{eq} in the 63 hertz 1/1 octave band over a 10 minute period at sensitive receivers must not exceed $L_{eq,63\ Hertz}$ 75 dB in Zone 1 and 70 dB in Zone 2.*
- *between midnight and 2am, the Music Noise Level when measured as:*
  - *L_{eq} in the 63 hertz 1/1 octave band over a 10 minute period at sensitive receivers must not exceed $L_{eq,63\ Hertz}$ 70 dB in Zone 1 and 65 dB in Zone 2.*
- *During periods of adverse meteorological conditions (including periods of strong winds or temperature inversion) an additional 5 dB allowance is added to the above noise limits. In these circumstances, the event is required to implement all reasonable and feasible acoustic controls to limit the potential impacts associated with event noise emissions.*

Figure 2.2 below identifies the proposed inner noise control zone, covering the area within 1 km of the Parklands venue, along with the maximum measured $L_{eq,oct(63Hz)}$ noise levels recorded during SITG 2015.

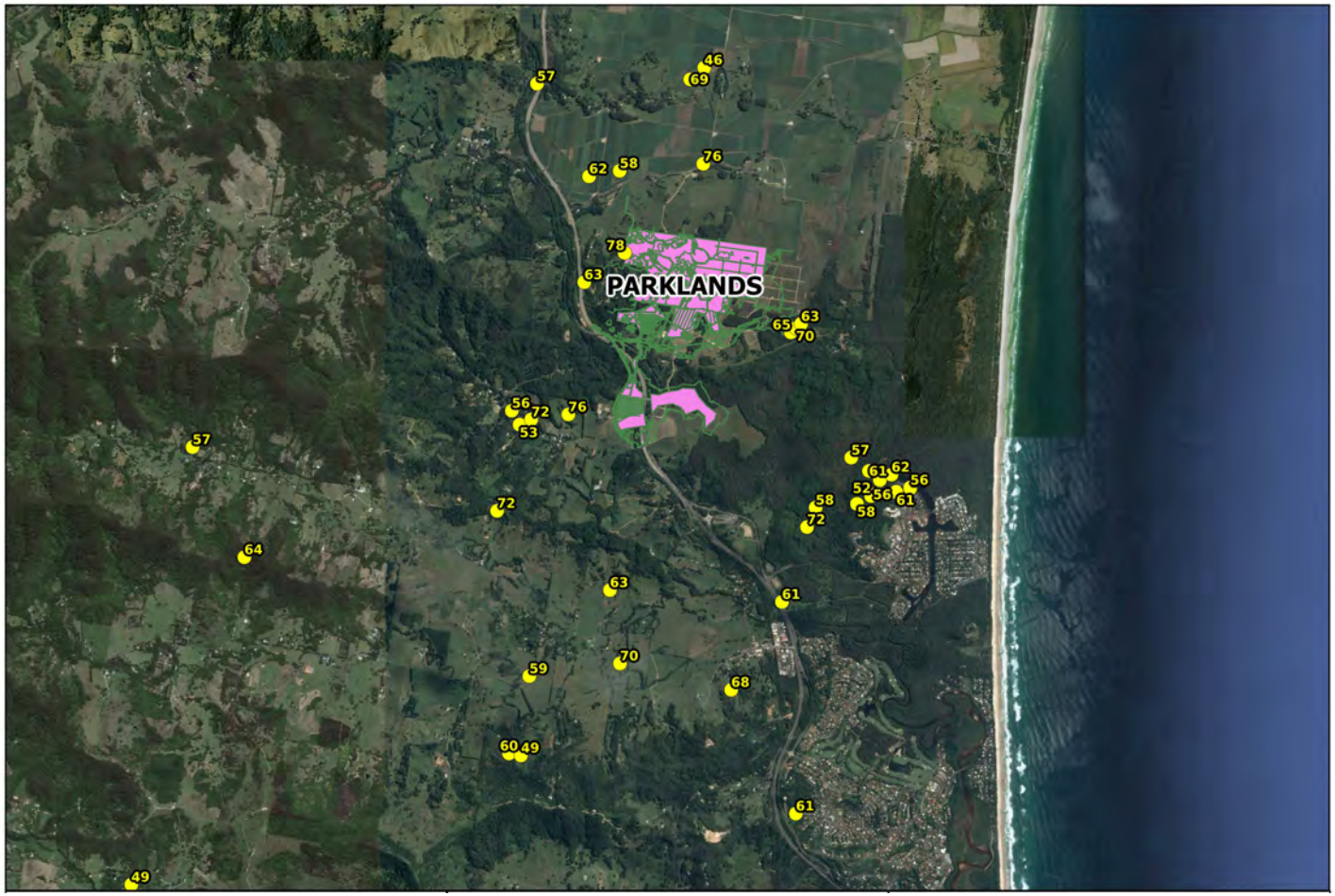

Figure 2.1: Maximum measured $L_{eq,oct(63Hz)}$ measured throughout SITG 2015 (dB)

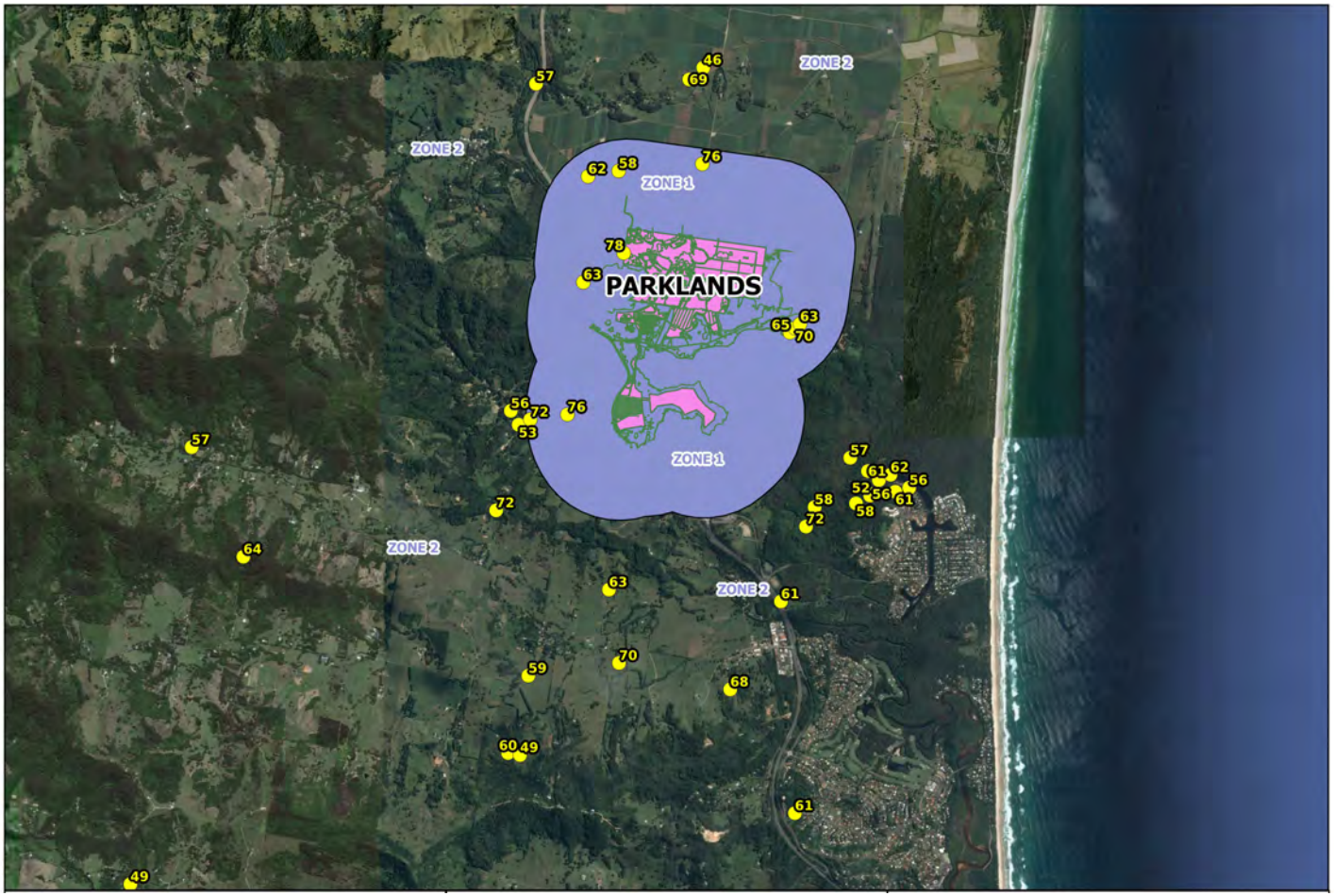

Figure 2.2: Proposed noise limit zones and maximum measured $L_{eq,oct(63Hz),}$ SITG 2015 (dB)

2.2.2 A-Weighted Noise

2.2.2.1 Receptors Near To Parklands

Figure 2.3 presents a summary of the maximum measured L_{Aeq} at each of the receptor locations at which event noise was audible during the attended noise monitoring. It should be noted that band-pass filtering was not applied for any of these measurements. As such, for some locations, there was some influence from extraneous sources such as insects and frogs.

At receptors within 1 km of the Parklands venue, the results of the monitoring confirm that compliance with the recommended alternative noise limits was observed for all receptors with the exception of receptors located on Wooyung Road and a single receptor to the south of the venue. These monitoring positions are all noted to be heavily impacted by road traffic noise and as such the results are not representative of noise emissions from the event.

2.2.2.2 Receptors Beyond 1 Km From Parklands

At distances of more than 1 km from Parklands, review of the measured noise levels presented in Figure 2.3 indicates that L_{Aeq} noise levels remained below or equal to 60 dB at all times with the exception of a single location in Crabbes Creek where measured noise levels exceeded this level by 1 dB.

On this basis, as with the low frequency analysis, at distances beyond 1 km from the venue, a lower noise limit could reasonably be applied to provide more certainty for residences in this area. It is therefore recommended that, as was the case for low frequency noise levels, different noise limits are applied for both Zones 1 and 2 as follows:

Controls established by the event are adequate to ensure that:

- *between 11 am and midnight, the Music Noise Level when measured as:*
  - *L_{Aeq} over a 10 minute period at sensitive receivers must not exceed 65 dB(A) in Zone 1 and 60 dB in Zone 2.*
- *between midnight and 2am, the Music Noise Level when measured as:*
  - *L_{Aeq} over a 10 minute period at sensitive receivers must not exceed 55 dB(A) in Zone 1 and 50 dB in Zone 2.*
- *During periods of adverse meteorological conditions (including periods of strong winds or temperature inversion) an additional 5 dB allowance is added to the above noise limits. In these circumstances, the event is required to implement all reasonable and feasible acoustic controls to limit the potential impacts associated with event noise emissions.*

The proposed noise zones are identified on Figure 2.4.

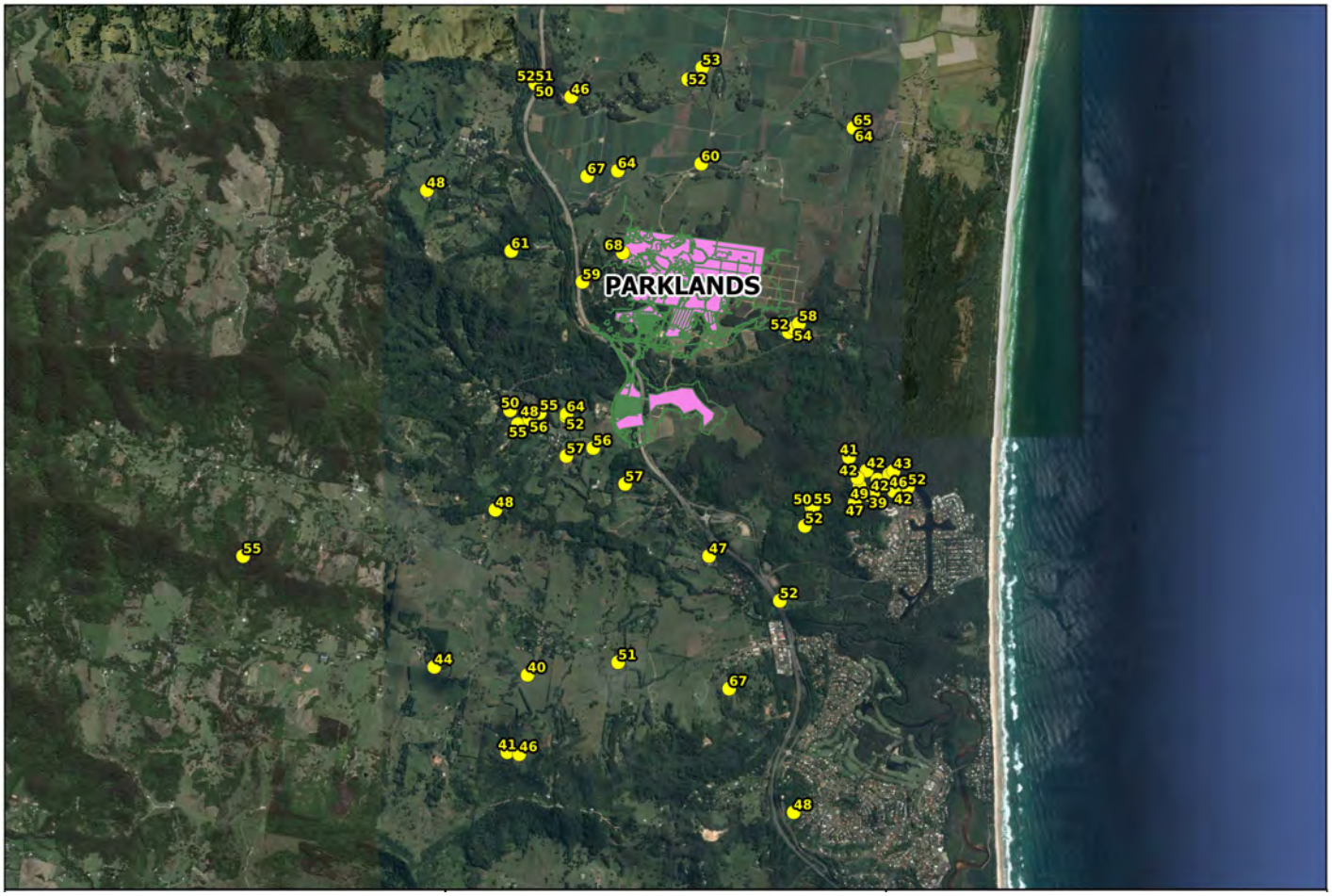

Figure 2.3: Maximum measured L_{Aeq} noise levels(dB) SITG 2015

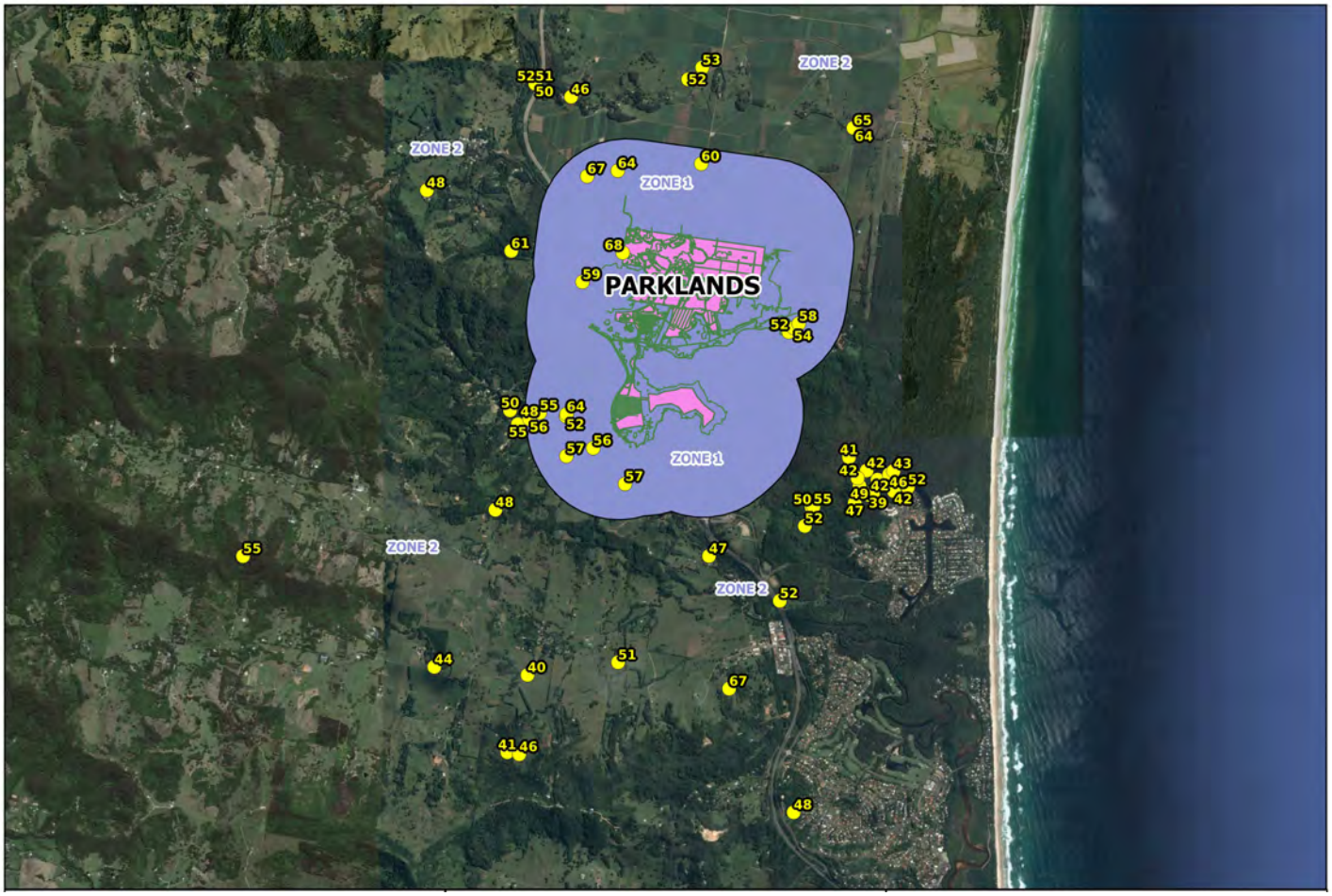

Figure 2.4: Proposed noise limit zones and maximum measured L_{Aeq} (dB) SITG 2015

3 Conclusions

A review of the suitability of the proposed noise limits previously recommended for outdoor music events held at Parklands has been undertaken following collation of the results of attended noise monitoring during SITG 2015. The review has specifically considered whether there is potential to apply alternative noise limits lower than those previously recommended for receptors at greater distance from the venue.

This has been undertaken due to a perceived risk that Parklands could enter into agreements with all nearby receptors in accordance with the conditions of approval and thereby permit them to increase source noise emissions beyond those reasonably required in order to maintain the patron experience. Through this review it has been identified that alternative noise limits could be applied at receptors beyond 1 km from the Parklands venue.

Given this, it is recommended that the following alternative noise limits be considered by the Department of Planning and Environment for future events held at Parklands:

Controls established by the event are adequate to ensure that:

- *between 11am and midnight, the Music Noise Level when measured as:*
  - *L_{Aeq} over a 10 minute period at sensitive receivers must not exceed L_{Aeq} 65 dB(A) in Zone 1 and 60 dB(A) in Zone 2 as depicted in Figure 3.1 below; and*
  - *L_{eq} in the 63 hertz 1/1 octave band over a 10 minute period at sensitive receivers must not exceed $L_{eq,oct(63\ Hertz)}$ 75 dB in Zone 1 and 70 dB in Zone 2 as depicted in Figure 3.1 below.*
- *between midnight and 2am, the Music Noise Level when measured as:*
  - *L_{Aeq} over a 10 minute period at sensitive receivers must not exceed L_{Aeq} 55 dB(A) in Zone 1 and 50 dB(A) in Zone 2 as depicted in Figure 3.1 below; and*
  - *L_{eq} in the 63 hertz 1/1 octave band over a 10 minute period at sensitive receivers must not exceed $L_{eq,oct(63\ Hertz)}$ 70 dB in Zone 1 and 65 dB in Zone 2 as depicted in Figure 3.1 below.*
- *During periods of adverse meteorological conditions (including periods of strong winds or temperature inversion) an additional 5 dB allowance is added to the above noise limits. In these circumstances, the event is required to implement all reasonable and feasible acoustic controls to limit the potential impacts associated with event noise emissions.*

These alternative noise limits are considered appropriate to provide greater certainty for nearby sensitive receptors relating to expected noise emissions from the venue for future events.

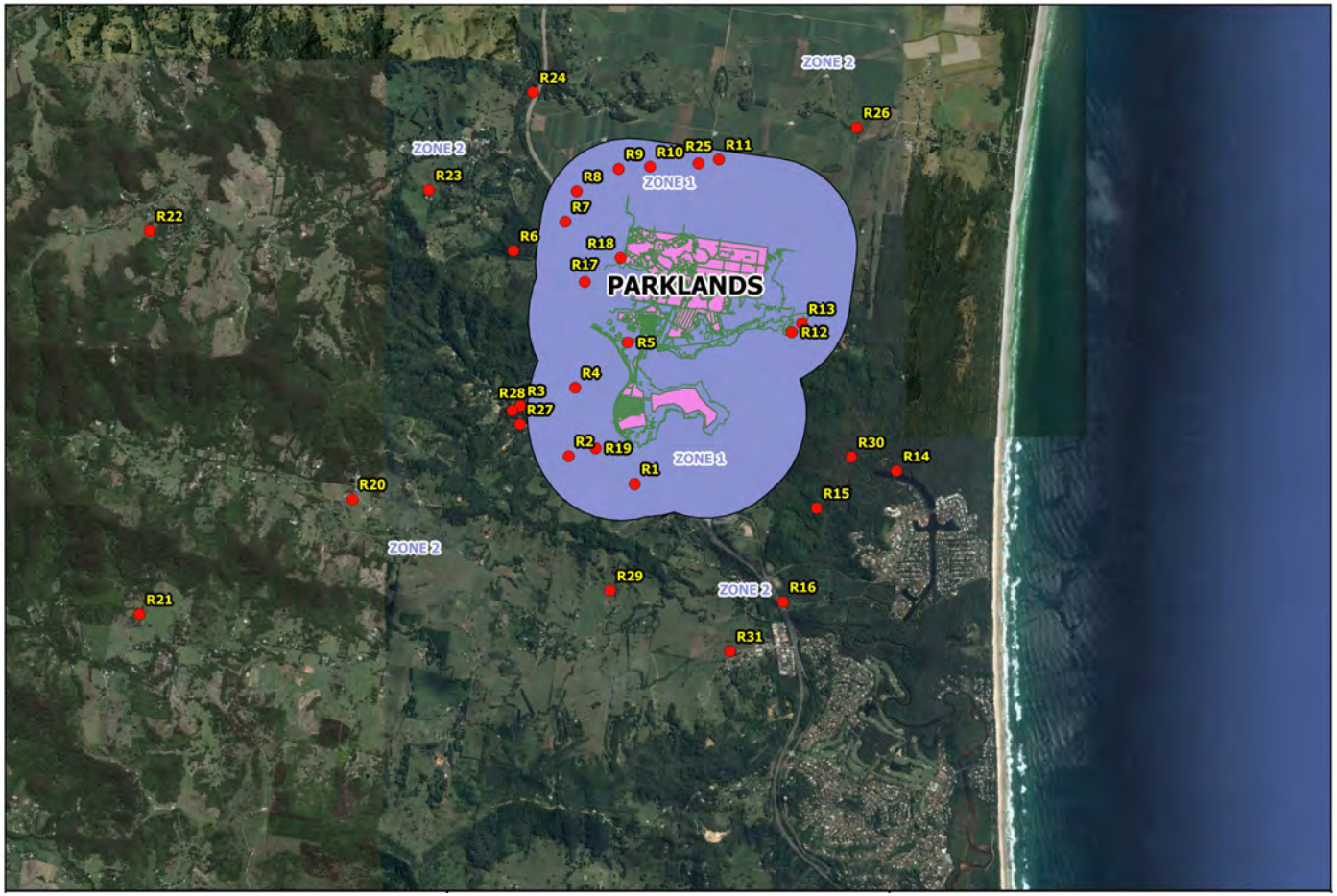

Figure 3.1: Representative receptors and proposed noise limit zones

Appendix A – Acoustic Glossary

APPENDIX A – ACOUSTIC GLOSSARY

Accredited Acoustical Consultant means an acoustical consultant who is a member of one or more of the following organisations: The Association of Australian Acoustical Consultants; The Australian Acoustical Society; or the Institution of Engineers Australia.

Background Noise Level is the underlying level of noise present in the ambient noise, excluding event noise, when extraneous noise is removed. This is described using the L_{A90} descriptor. The background noise level is to be the single figure background level representing each period of the event.

dB(A) is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

dB(C) is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. 'C' weighting) that places an increased focus on low frequency (bass) noise.

Ecological Sensitive Receptors means the animals within Taronga Zoo.

Event means an outdoor event whose primary purpose is entertainment involving continuous amplified musical performance taking place within a single 24 hour period.

Event Noise means noise from amplified entertainment noise measured as one of L_{Aeq} or $L_{Ceq,63\ Hertz}$.

Event Stage Manager means the person at the sound mixing console (or sound desk), who is in control of the volume of noise emanating from the speakers installed at an event;

L_{Aeq} is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period.

$L_{Ceq,63\ Hertz}$ is the equivalent steady sound level in the 63 Hertz 1/1 octave band measured in dB(C) containing the same acoustic energy as the actual fluctuating sound level over the given period.

L_{AMax} means A - weighted maximum RMS sound pressure level measured over a one (1) second interval. During noise measurements, this is the absolute highest (maximum) noise level for a given time period.

L_{CMax} means C - weighted maximum RMS sound pressure level measured over a one (1) second interval. During noise measurements, this is the absolute highest (maximum) noise level for a given time period. The 'C' frequency weighting scale is relatively flat or contains little adjustment to the linear or Z weighted, dB(Z) noise level.

L_{A90} is the noise level (measured in dB(A)) exceeded for 90% of the time. In the case of Taronga Zoo, the background noise level is defined by the measured L_{A90} noise level (see Background Noise Level above).

Sensitive Receiver means places such as residences, schools, childcare centres, hospitals and churches.

Sound Check means a test of the sound amplification equipment for an outdoor concert .