Acoustic Impact Assessment

Premium Mushrooms
172-182 Boundary Road
Glossodia, NSW

Project 215 035

October 2015

File : *215 035 R01 v1-1 Acoustic Impact Assessment*

Prepared For
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Contents

1 INTRODUCTION

PKA Acoustic Consulting has been commissioned by Urban City Consulting on behalf of Mr Robert Tolson to provide an acoustic report to assess the noise impact of the proposed extension of mushroom farm at 172-182 Boundary Road, Glossodia upon the surrounding environment. As part of DA documentation an acoustic report has been requested by Hawkesbury Council.
The purpose of this report is to assess potential noise impact from the proposed extension of the facility and to provide noise control recommendations if required.

This report is based on site measurements and inspections conducted by PKA Acoustic Consulting.
As part of the extension, the management have purchased the property to the south namely 172 Boundary Road which extends to the east of the existing farm. The expansion will be addition of new buildings and operations mainly for mushroom growing. The expansion program will be in 3 stages. A new building for mushroom growing will be added at each stage.

The proposed hours of operation of the facility will be

- 6 am to 12 midnight 7 days a week.

2 SUMMARY

PKA Acoustic Consulting has been commissioned by Urban City Consulting on behalf of Mr Robert Tolson. to provide an acoustic report to assess the noise impact of the proposed extension of mushroom farm at 172-182 Boundary Road, Glossodia upon the surrounding environment. As part of DA documentation an acoustic report has been requested by Hawkesbury Council.

The site was visited by the PKA personnel to conduct a noise survey. An acoustic assessment was conducted in accordance with the noise requirements of Hawkesbury Council and EPA NSW Industrial Noise Policy and relevant Australian standards and guidelines. Noise monitoring was conducted on site to obtain the ambient noise levels. Attended noise measurements were also conducted to measure operational noise levels.

Noise emission levels were calculated to the nearest sensitive noise receivers. The noise levels were assessed against the relevant criteria. Calculations indicated that for some operations exceedances are likely to occur. Recommendations are given for consideration and compliance with the criteria.

Providing our recommendations are implemented, the operation of the proposed extensions of the facility will comply with the acoustic requirements of Hawkesbury Council and NSW Industrial Noise Policy.

3 SITE DETAILS

The site is bounded by Boundary Road on the west, rural-residential properties on the south and east, and bushlands to the north.
The site location is shown in Figure 1.

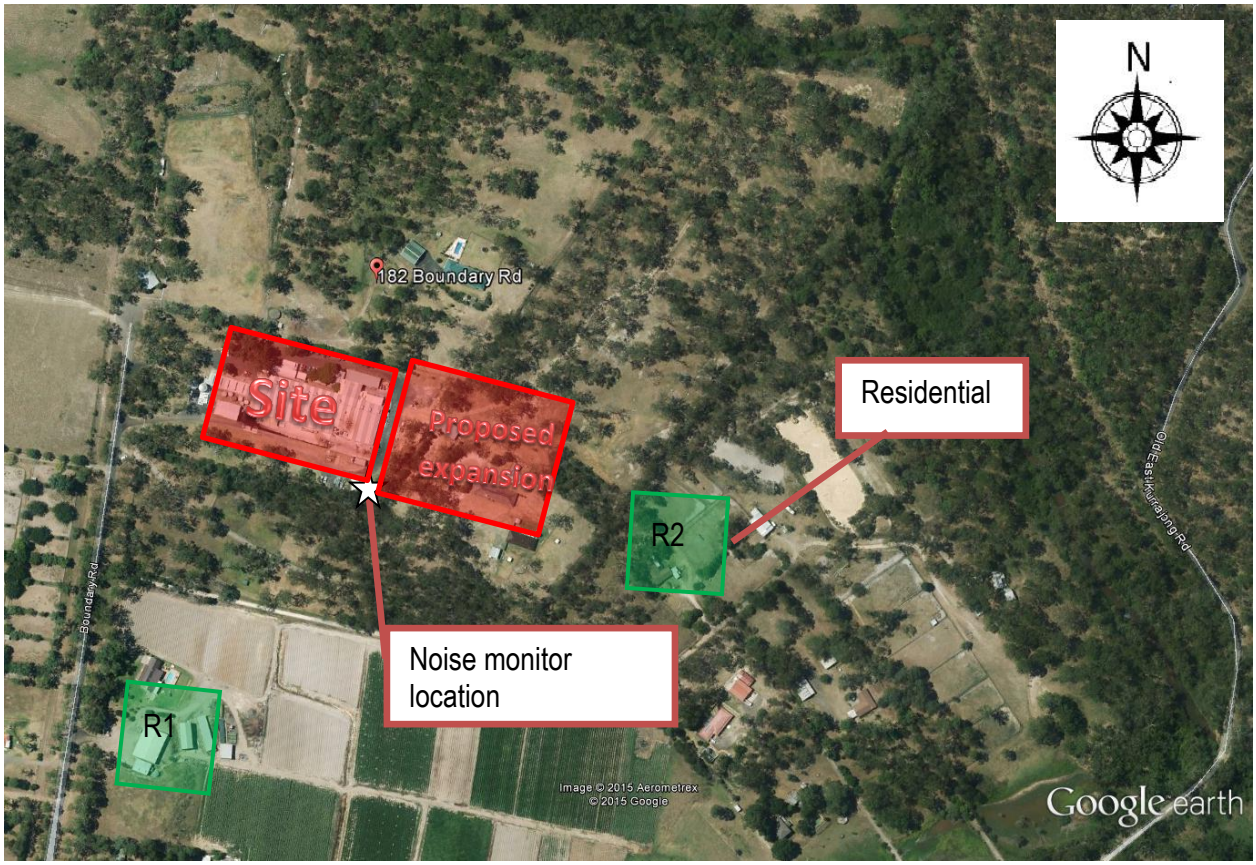


Figure 1 Site Location

The nearest noise sensitive receivers which have potential for noise impact are as follows:

- R1- Residential receiver to the south, across the boundary, 200 m to the building.
- R2- Residential property to the west across the newly acquired property, 90 m to the boundary.

The location for the noise receivers are shown in Figure 1 above.

4 NOISE CRITERIA

The following standards and guidelines were considered for this assessment

- Hawkesbury Council acoustic requirements
- EPA NSW Industrial Noise Policy
- EPA NSW - Noise Guide for Local Governments

The requirements of each are considered separately as follows:

4.1 Hawkesbury Council requirement

Section 2.7 of Part D of Council DCP 2002 is on environmental issues of industrial developments and provides general recommendations for such control. The section requires that for any machinery or activity which creates noise nuisance should be adequately sound proofed in accordance with the provisions of the Protection of the Environment Operations act 1997. As the document does not provide any specific criteria for noise limits, we will consider compliance and details of NSW Industrial Noise Policy for the assessment.

4.2 NSW Industrial Noise Policy

Noise generated from commercial and industrial premises is generally assessed against the requirements of EPA Industrial Noise Policy (INP). 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.

4.2.1 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

4.2.2 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 EPA Noise Guide for Local Governments (Sleep Disturbance)

The EPA 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 15 dB(A) outside a resident's bedroom window between 10pm and 7am.

4.4 EPA NSW Road Noise Policy (RNP)

Noise from the vehicles associated with the proposed facility will be assessed using EPA NSW Road Noise Policy. Table 1 presents the noise assessment criteria for land use developments with potential to create additional traffic on existing roads.

Table 1 Road traffic criteria for residential land use

Road category	Type of project/land use	Assessment criteria, dBA	
		Day: 7am-10 pm	Night: 10pm – 7 am
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use development	Leq (1 hr) 55 (external)	Leq (1 hr) 50 (external)

In cases noise exceeds the above criteria:

1- The RNP recommends that "where feasible, existing noise levels should be mitigated to meet the noise criteria. In this regard the RNP states that for existing roads there is limited potential for noise control as the development is not linked to road improvements. It does however advise that applicable strategies include appropriate location of private access roads, regulating times of use, using clustering, using quiet vehicles, and using barriers and acoustic treatments".
2- For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use development, any increase in total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

5 NOISE SURVEY

Noise monitoring was previously conducted on this site for the initial acoustic assessment. Monitoring was conducted from 23rd February to 5th March 2012. Since there has been no development or changes in the area the ambient noise levels were considered to be unchanged therefore we have used monitoring results of that period. The monitor was placed on site on the eastern boundary to measure the ambient noise. The continuous monitoring consisted of sampling in 15 minute periods, using an A-weighting curve before converting the information to statistical quantities LAeq, L90, Lmax and Lmin and commencing a new period.
The position of noise monitor is shown in Figure 1 in Section 3 of this report.

Attended noise measurements were also made to measure noise levels. Measurements were made on 23rd February 2012 and 8th October 2015.

5.1 Instrumentation

Noise measurements were conducted using the following equipment:

- Environmental Data Logger ARL EL-316 Serial number16-207-030
- Sound calibrator B&K 4230, Serial number 9299985
- Precision Sound analyser Svan type 949
- Precision Sound analyser NTI XL2-TA, Serial number A2A-06988-E0

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

5.2 Ambient levels and noise goals

Noise data from the monitor were used to establish the noise goals. For those occasional periods where adverse weather conditions prevailed, the noise data was disregarded. Appendix B presents the noise data in the graphical form.
Table 2 below presents the ambient, background noise and Project Specific Levels. Values have been rounded to the nearest 0.5 dB.

Table 2 Ambient noise levels and INP Noise Criteria

Receiver Type	Period	Existing noise levels dB		Acceptable Noise Levels per INP LAeq	Noise Criteria dB		
		LAeq	Background, RBL		Amenity LAeq	Intrusiveness	Project Specific Levels
Residential	Day	49	41	50	50	46	46
	Evening	56	41	45	45	46	45
	Night	53	42	40	40	47	40
Commercial	At any time	56	-	65	65	-	65

Hence noise from mechanical services and operation of the facility should comply with Project Specific Levels which can be summarised as follows:

Table 3 Project Specific Noise Criteria

Receiver Type	Period	Project Specific Critera dB
Residential	Day	46
	Evening	45
	Night	40
Commercial	At any time	65

5.3 Operational noise level measurements

The following noise levels were measured during a site visit on Thursday 8th October 2015 to determine the noise levels of the existing operations at the site. Values have been rounded to the nearest 0.5 dBA.

Table 4 Operational noise level measurements

Reference	Test	Leq, dBA	L1, dBA
1	Loader noise @2.5m, mixing peats	83.5	95.0
2	Floor spray wash @ 2m, no gun	90.5	94.0
3	Floor spray wash @ 2m, gun fitted	89.5	92.5
4	Lift truck operation @2m	82.0	93.0
5	(compost)Truck , pass by @ 2m	81.0	85.5
6	(compost) Truck, Reverse & idle @ 2m	80.0	91.5
7	Truck unloading compost on a conv belt @ 2m	80.0	87.0
8	Filling machine @ 2m	76.5	86.5

5.4 Truck noise levels

5.4.1 Rigid Trucks (medium)

Attended noise measurements were made on site to obtain truck noise levels. Noise measurements were made of a rigid truck entering the area driving into position to unload. Noise details such as truck driving at low speed, truck idling, truck air break, driver opening & shutting the door, electric forklift noise, metal bar arranger were included in the measurement. The measurement took approximately 3 minutes from the point of entry until the engine was switched off. The equivalent 15 minute noise level was then calculated for the assessment. The truck noise levels are presented in Table 5.

Table 5 Noise levels- Rigid truck

Truck	Distance	Leq (15 min), dBA	L1, dBA
Rigid	40 m	47.5	70

5.4.2 Large 19 m articulated trucks

For the 19 m articulated trucks noise data from PKA database were used. Noise from a 19m truck was previously measured and stored in PKA database. The value is presented in Table 6.

Table 6 Noise levels- Articulated truck

Truck	Distance	Leq (15 min), dBA	L1, dBA
19 m articulated	25 m	52	70

6 ACOUSTIC ASSESSMENT AND DISCUSSION

The growing rooms will be part of the extension of the existing facility. Mushrooms will be grown in the proposed growing rooms. The growing rooms construction will be in 3 phases each consisting of a new shed. Each shed will be 46.8 m by 142.5 m. The position of 3 proposed sheds (growing rooms) is shown in Figure 2.

Figure 2 Position of the proposed growing rooms

The structure of the growing rooms will be as follows:

- Walls: 100 mm aerated concrete
- Ceiling: 100 mm PIR sandwich panel

The proposed hours of operation of the farm will be 6 am to 12 midnight. Although some staff may arrive before 7 am, the main operations such as peat mixing, arrival of compost truck etc will be after 7 am.

6.1 Operational noise

Noise will be emitted from various areas within the site. The operational noise will be from outdoor areas such as the peat shed and the truck loading bay, and from the internal spaces such

as the growing rooms. Noise will also emanate from the car parks and from trucks travelling through the site.

We have been advised that there will be 3 type of trucks on site:

1. Pick up trucks – Picking up mushrooms to deliver to the markets.
2. Walking floor truck – Used for delivery of compost. These have walking platform and a hydraulic system to deliver onto a conveyor belt.
3. Waste trucks – Truck and dog are used to take the compost to the tippers.

6.2 Peat shed

Mixing of peat occurs with a small loader at the peat shed. Noise would travel to the south eventually to the noise receptor R1.The noise level of this operation was calculated to the receiver R1. Attenuation effects of distance and directivity were considered in the calculations. A summary of results is presented in Table 7.

Table 7 Summary of noise level calculations – Peat shed

Receiver	Period	Noise level at peat shed Leq, dBA	Noise level at residential receiver R1, Leq(15 min), dBA	Criteria, Leq dBA	Complies (Y/N)
Residential R1	Day (7am-6 pm)	83.5	45	46	Yes
	Evening (6pm-10 pm)	83.5	45	45	Yes

The above summary calculations indicate that at the residential receiver, noise emissions from the peat shed will just comply with the daytime and evening criteria. The compliance is on the border line therefore precautionary measures may be required if the activities increase in future.

Noise emissions from a spray wash on the outdoor concrete floor close to the peat shed was calculated to the residential receiver R1. The attenuation effects of distance and directivity were considered in the calculations. A summary of results is presented in Table 8.

Table 8 Summary of noise level calculations – Floor spray wash, outside

Receiver	Period	Noise level at 2m Leq, dBA	Noise level at residential receiver R1, Leq(15 min), dBA	Criteria, Leq dBA	Complies (Y/N)
Residential R1	Day (7am-6 pm)	90.5	48	46	No
	Evening (6pm-10 pm)	90.5	48	45	No

The noise from outdoor spray wash does not comply with the criterion therefore mitigation measures will be required. We recommend the installation of an acoustic barrier to the south of

this area to reduce the noise by 5 dBA. The barrier should be to the height of 2.4 m above the concrete surface and should be constructed of acoustic material such as 10 mm fc sheets or sheet metal colourbond. The barrier should have no gaps and openings and should extend 2m beyond this area in each direction.
We recommend the barrier to be installed on the south edge of the truck route and be extended 2m beyond the peat shed. This will provide shielding from peat mixing noise and the passing trucks and will help to reduce the cumulative noise levels. The position of the proposed barrier is shown in Figure 3.

Figure 3 Position of the proposed acoustic barrier

6.3 Growing rooms

Growing rooms will be the main portion of the proposed extension which house the mushrooms while they develop. Operations such as delivery and filling of compost, spray washing of the floors will take place within the growing rooms.
Trucks will deliver compost into conveyor belts and filling machines to distribute the compost to the growing areas. At the initial phases the trucks will be delivering from outside, but eventually they will move to the inside therefore the noise will be contained within the building. We have been advised that emptying a shed should take an hour and consist of 2 truck and dog loads. Filling time is about 30 minutes per truck. Room is normally emptied between 7 am and 10 am.

We have also been advised that doors and windows, especially the large doors facing south and east, will generally be kept closed.

6.3.1 Filling

Noise emissions from a truck delivering into the filling machine via a conveyor belt will be contained inside the growing room. The noise level was calculated to the residential receiver to the east (R2). The attenuation effects of the building fabric, distance and directivity were considered in the calculations. We have assumed that the doors and windows to the south and east will remain closed. A summary of results is presented in Table 9.

Table 9 Summary of noise levels – Filling machine & truck inside the growing room

Receiver	Period	Noise level inside growing room, Leq, dBA	Noise level at residential receiver R2, Leq(15 min), dBA	Criteria, Leq dBA	Complies (Y/N)
Residential R2	Day (7am-6 pm)	82	< 30	46	Yes
	Evening (6pm-10 pm)	82	< 30	45	Yes

6.3.2 Hand floor washer

Concrete area is normally hosed after emptying and is cleaned by a pressure spray washer. Noise emissions from a spray wash inside the growing room was calculated to the nearest residential receiver (R2). The attenuation effects of the building fabric, distance and directivity were considered in the calculations. A summary of results is presented in Table 10.

Table 10 Summary of noise level calculations – Floor Spray wash inside the growing room

Receiver	Period	Noise level inside growing room, Leq, dBA	Noise level at residential receiver R2, Leq(15 min), dBA	Criteria, Leq dBA	Complies (Y/N)
Residential R2	Day (7am-6 pm)	92.5	< 30	46	Yes
	Evening (6pm-10 pm)	92.5	< 30	45	Yes

The summary calculation above indicate that noise emissions from operations inside the growing rooms comply with daytime and evening criteria therefore no further acoustic treatment will be required.

6.4 Truck noise

Truck noise emissions will be from trucks travelling on site and from the loading bay as follows.

6.4.1- Travelling along the site.

We have been advised of the following information regarding truck movements which we have assumed for our calculations. The compost trucks enter the site and will travel along the south side of the existing building. Noise emissions from a truck driving through the site was calculated to the southern residential receiver R1. The attenuation effects of distance and directivity were considered in the calculations. A summary of results is presented in Table 11.

Table 11 Summary of noise level calculations –Truck driving through the site

Receiver	Period	Truck noise level at 2m Leq, dBA	Noise level at residential receiver R1, Leq(15 min), dBA	Criteria, Leq dBA	Complies (Y/N)
Residential R1	Day (7am-6 pm)	81	41	46	Yes
	Evening (6pm-10 pm)	81	41	45	Yes

The above summary calculations indicate that at the residential receiver, noise emissions from the trucks are likely to comply with the daytime and evening criteria therefore no mitigation measures will be required.

6.4.2 - At loading Bay.

The loading trucks will need to drive around the northern end of the building and eventually around the eastern edge of the existing building (in between the existing and the proposed building).
The new loading bay will be located between the existing building and the proposed growing rooms. A significant portion of the noise from the loading bay will be shielded to the east boundary receiver R2, but will be exposed to the south boundary receiver R1.
Noise emissions from the truck at the loading bay was calculated to the south boundary receiver R1. The attenuation effects of distance and directivity were considered in the calculations. A summary of results is presented in Table 12.

Table 12 Summary of noise level calculations –Truck noise on the loading bay

Receiver	Period	Truck noise level at 25 m Leq, dBA	Noise level at residential receiver R1, Leq(15 min), dBA	Criteria, Leq dBA	Complies (Y/N)
Residential R1	Day (7am-6 pm)	52	34	46	Yes
	Evening (6pm-10 pm)	52	34	45	Yes

The above summary calculations indicate that at the residential receiver, noise emissions from the loading bay are likely to comply with the daytime and evening criteria therefore no mitigation measures will be required.

6.5 Noise emissions from the carpark

The carpark is located on the north side of the existing building. With the proposed extension, the facility will have 99 employees. Assuming that all employees use their own vehicle to travel to work, there will be 99 vehicles in the carpark.
Noise emissions from the 99 cars driving into the carpark and getting into parking position have been calculated to the south receiver R1 for a 15 minute assessment period. It was assumed that all the staff will arrive within a 15 minute period (as in the beginning of a shift). The attenuation effects of distance, directivity and the acoustic shielding of the main building were considered in the calculations. A summary of calculations is presented in Table 13.

Table 13 Summary of noise emission levels from the carpark- Values in dBA

Sound power level, 1 car	Sound power level, 99 cars	Sound Pressure level in the carpark	Sound Pressure level at receiver R1	Criteria	Complies (Y/N)
76	96	88	32	46 (day)	Yes
				45 (evening)	Yes
				40 (Night)	Yes

The above summary calculations indicate that noise emissions from the carpark will comply with the criteria therefore no mitigation measures will be required

6.6 Sleep Disturbance

As the hours of operation are partially at night period (6am to 7am and 10pm to 12pm), the possibility of sleep disturbance should be considered.
The only noisy activity in the evening and the night time is the truck picking up mushrooms.

To establish a value for the Sleep Disturbance criteria, the minimum L90 background level at night times was obtained from the noise monitor data over the monitoring period. The lowest LA90 (15 min) background level between the hours of 6 am & 7 am and between 10 pm and 12 pm had a value of 40 dBA and occurred at 11:00pm on 28th February 2012. The sleep disturbance criteria will hence be 55 (= 40 + 15) dBA.
Peak noise levels from the operation of a truck and from the cars parking in the carpark was calculated to the façade of the nearest residential building R1. The attenuation effects of distance, directivity (and shielding of the main building for carpark noise sources) were considered in the calculations. A summary of calculations is presented in Table 14.
Table 14 Sleep Disturbance Noise Levels

Noise Receiver	Noise source	Sound Pressure Level at source, L1, dBA	Assessment		
			External noise level at receiver, L1, dBA	Criteria, L1, dBA	Complies (Y/N) ?
Residential R1	Operation of truck	70 @25 m	52	55	Yes
	Car door slam	80 @ 1m	34	55	Yes

The above summary calculations indicate that at the residential receiver, sleep disturbance is not likely to occur therefore no mitigation measures will be required.
However we would like to recommend the following:

- Truck drivers working at night time (after 10 pm) should be trained and required to keep the noise to a minimum.
- No noisy activities such as outdoor spray wash should take place between the hours of 10 pm and 7 am.

6.7 Accumulated noise

Although noise from individual activities may comply with the criteria, noise accumulation from simultaneous activities may add up and the resulting noise may exceed the criteria. As a rule, if two noise levels are within 10 dBA of each other, they will combine to result in an increased overall noise level.

Noise emission levels from the indoor activities are more than 10 dBA below the level of the outdoor activities, hence they will not result in an increased noise level and noise impact.

Noise accumulation will occur if the outdoor activities take place simultaneously and in some cases the accumulated level may exceed the criteria. For example the peat mixing noise, as perceived at receiver R1 has a value of 45 dBA. This level just meets the day time and evening criteria. Any simultaneous activity with a noise level difference within 10 dBA will result in accumulation of noise hence exceedance over the criteria.

Managerial solutions play an important role to prevent noise accumulation. We recommend the outdoor activities which are to the south of the building be scheduled so that they do not occur simultaneously. The main two noisy activities the peat mixing and outdoor spray wash should not be concurrent to prevent noise impacts.

7 Recommendations:

We recommend the following:

1. Installation of an acoustic barrier to the south of outdoor concrete area and the truck route. The barrier should be to the height of 2.4 m above the concrete surface and should be constructed of acoustic material such as 10 mm fc sheets or colourbond. The barrier should have no gaps and openings and should extend 2m beyond the spray wash area and the peat shed in each direction.
2. No high level noise activities should take place between the hours of 10 pm and 7 am.
3. Truck drivers working at night time (after 10 pm) should be trained and required to keep the noise to a minimum.

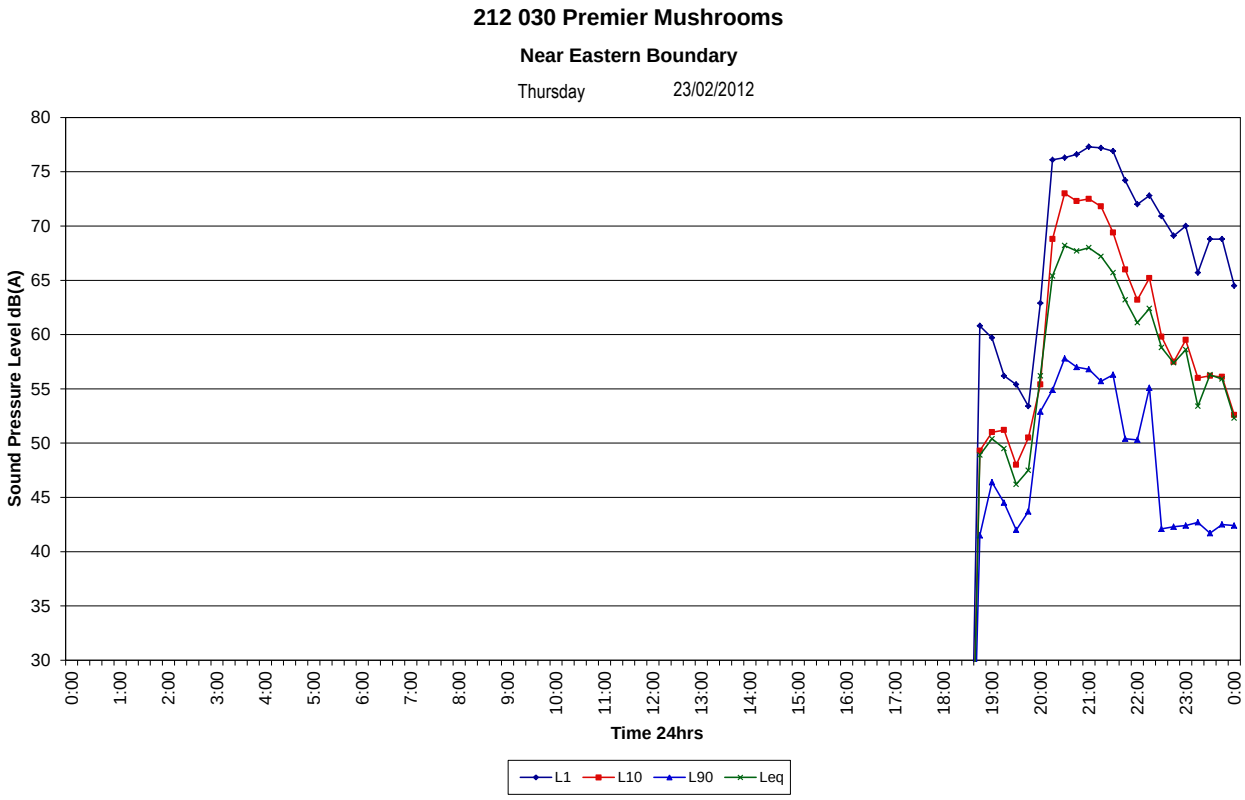
APPENDIX A – Architectural drawings

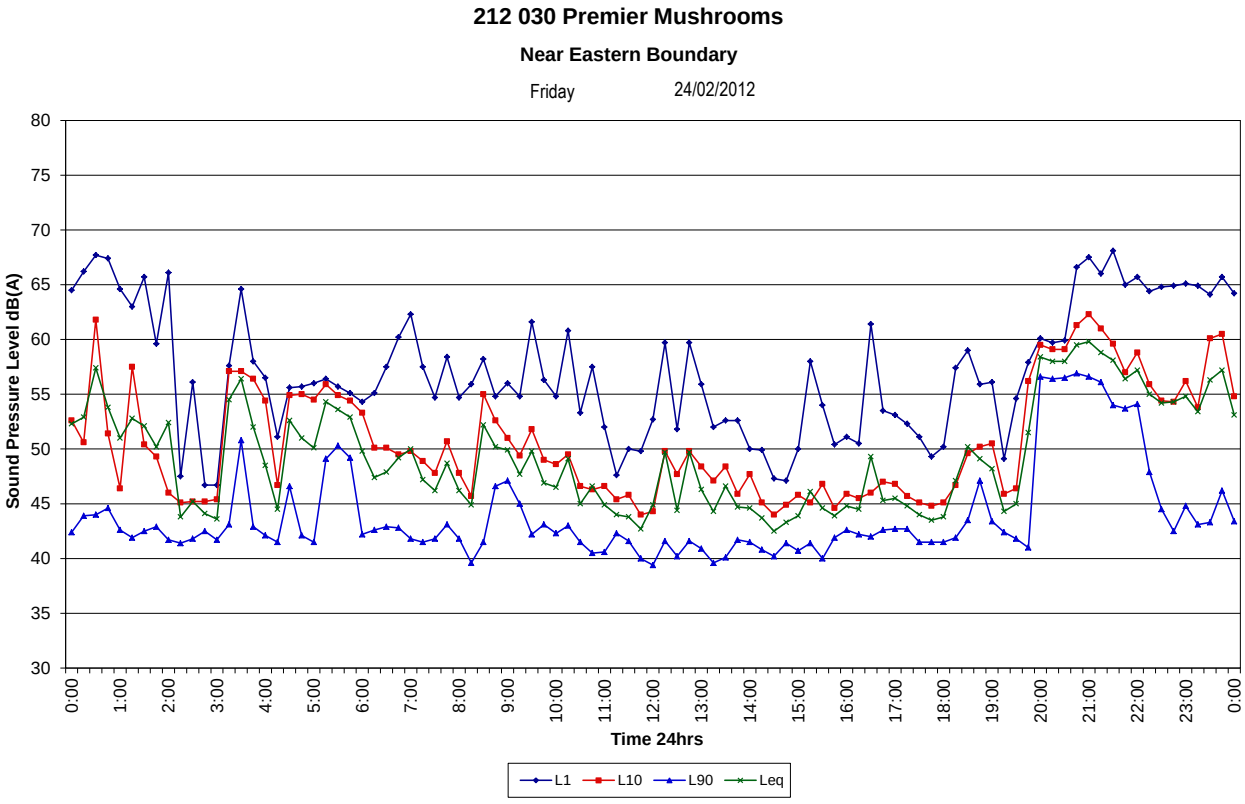
The following drawings drawn by Pippa Noble Creative were provided by the client and were used in the assessment.

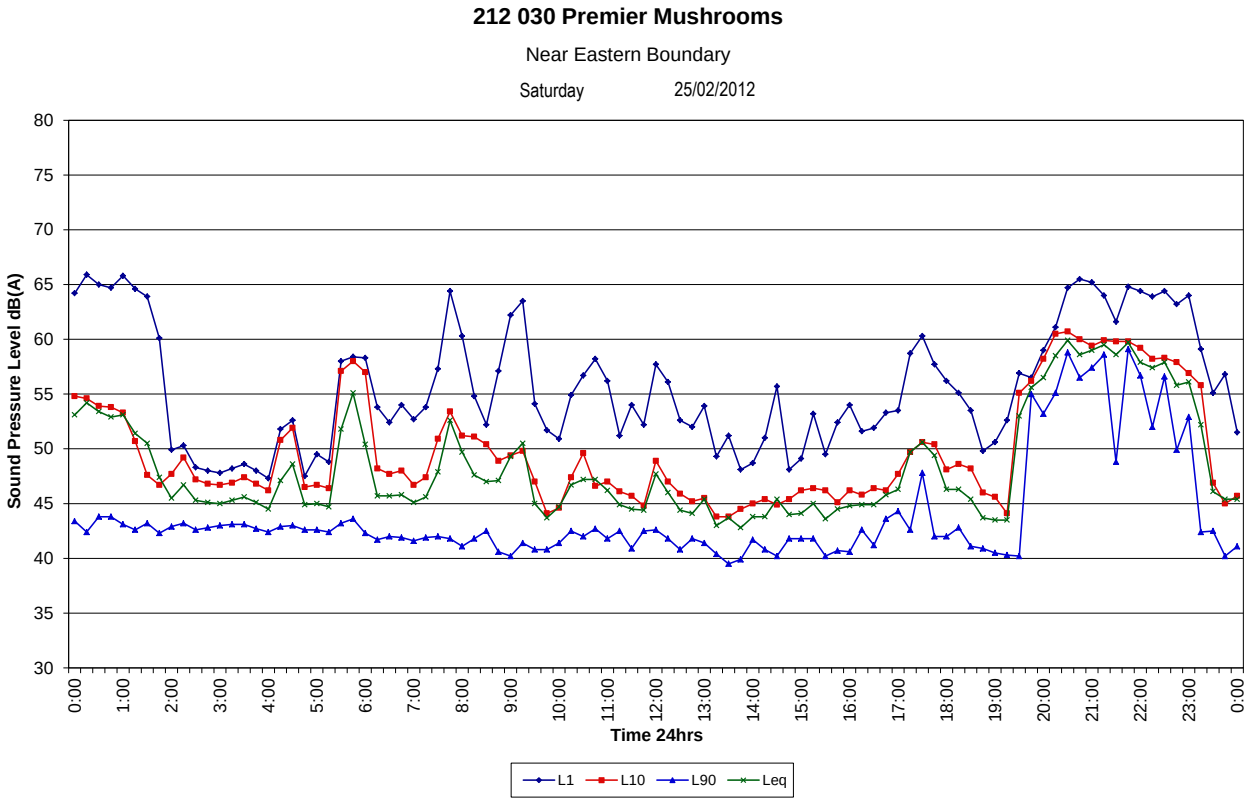
Drawing No	Revision	Title
DA1001	G	Existing site plan
DA1002	G	Proposed overall site plan (stage 1)
DA1003	G	Proposed overall site plan (stage 2)
DA1004	G	Proposed overall site plan (stage 3)
DA1500	G	Proposed overall floor plan
DA2004	G	Proposed peat store
DA2005	G	Proposed peat store elevations

APPENDIX B – Noise monitor results

The noise monitor data are presented in the graphical form as follows:



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Time 24hrs
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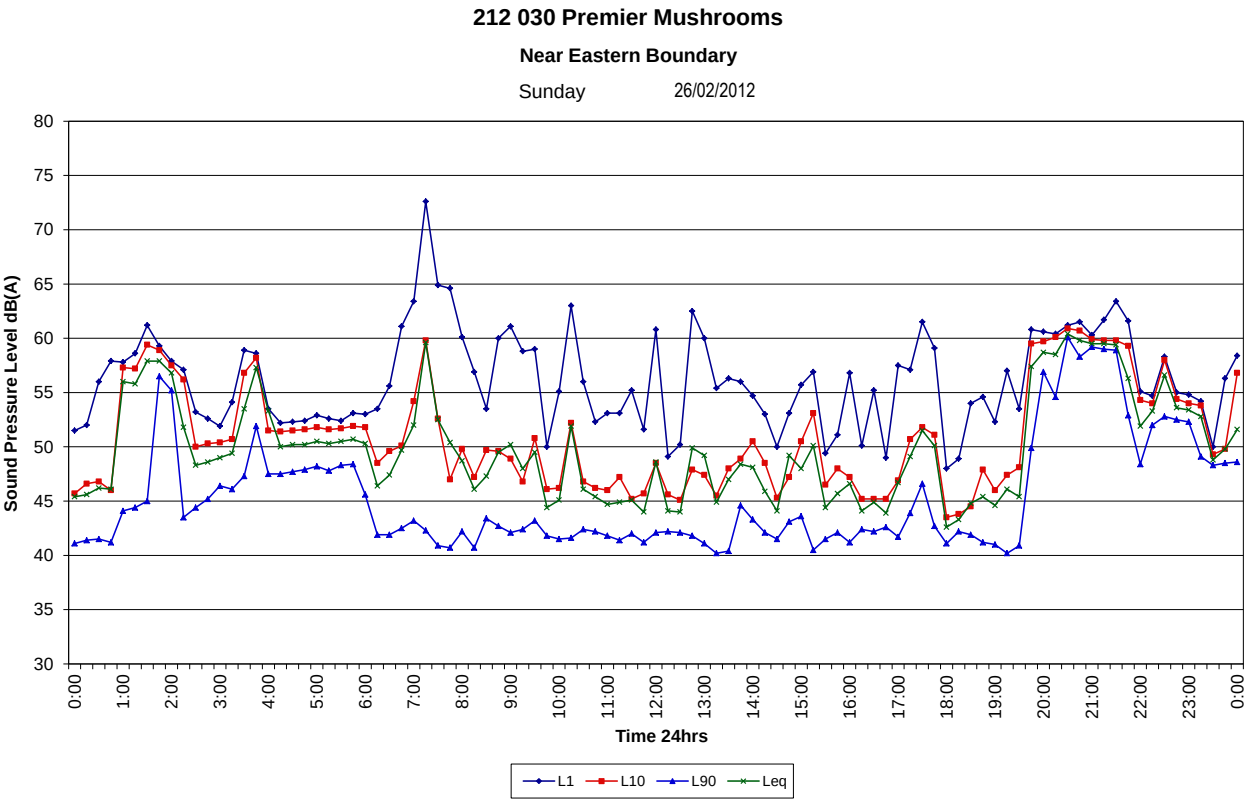
L10
L90
Leq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Near Eastern Boundary
Sunday 26/02/2012
Sound Pressure Level dB(A)
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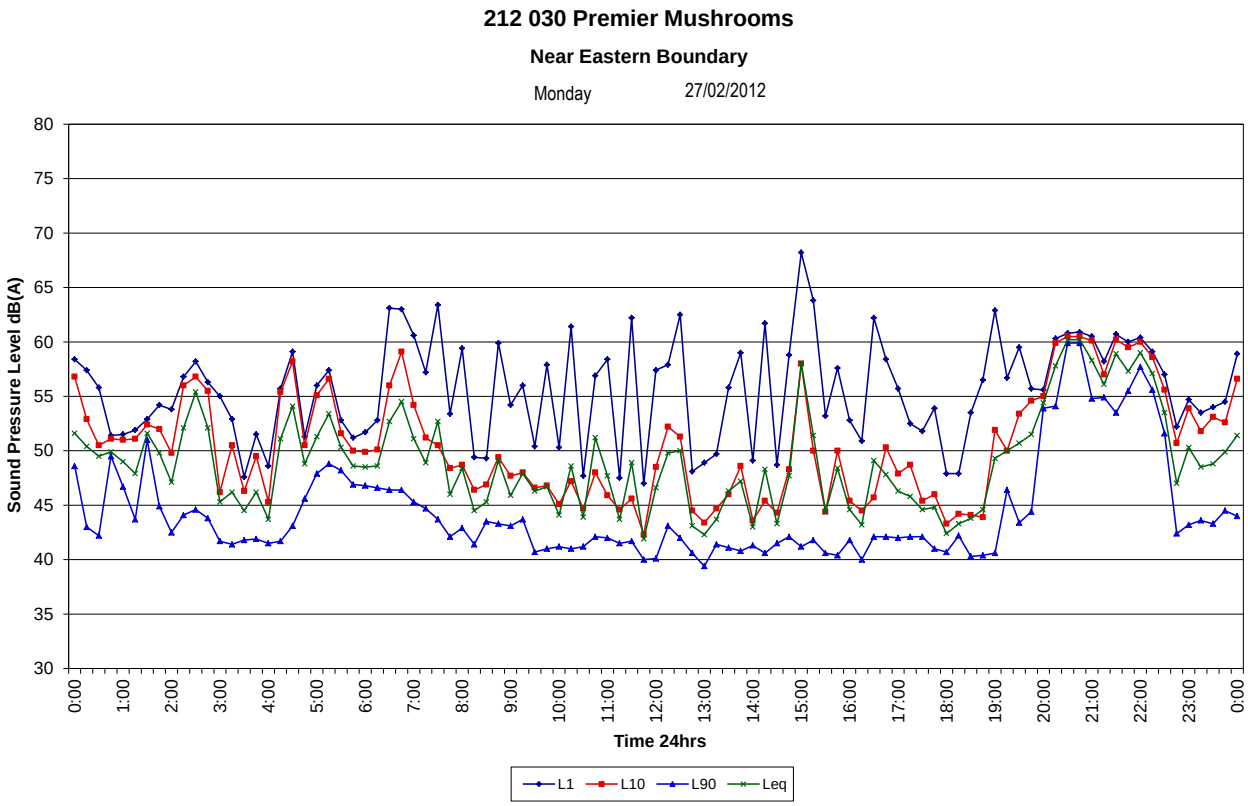
L1
L10
L90
Leq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Near Eastern Boundary
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Sound Pressure Level dB(A)
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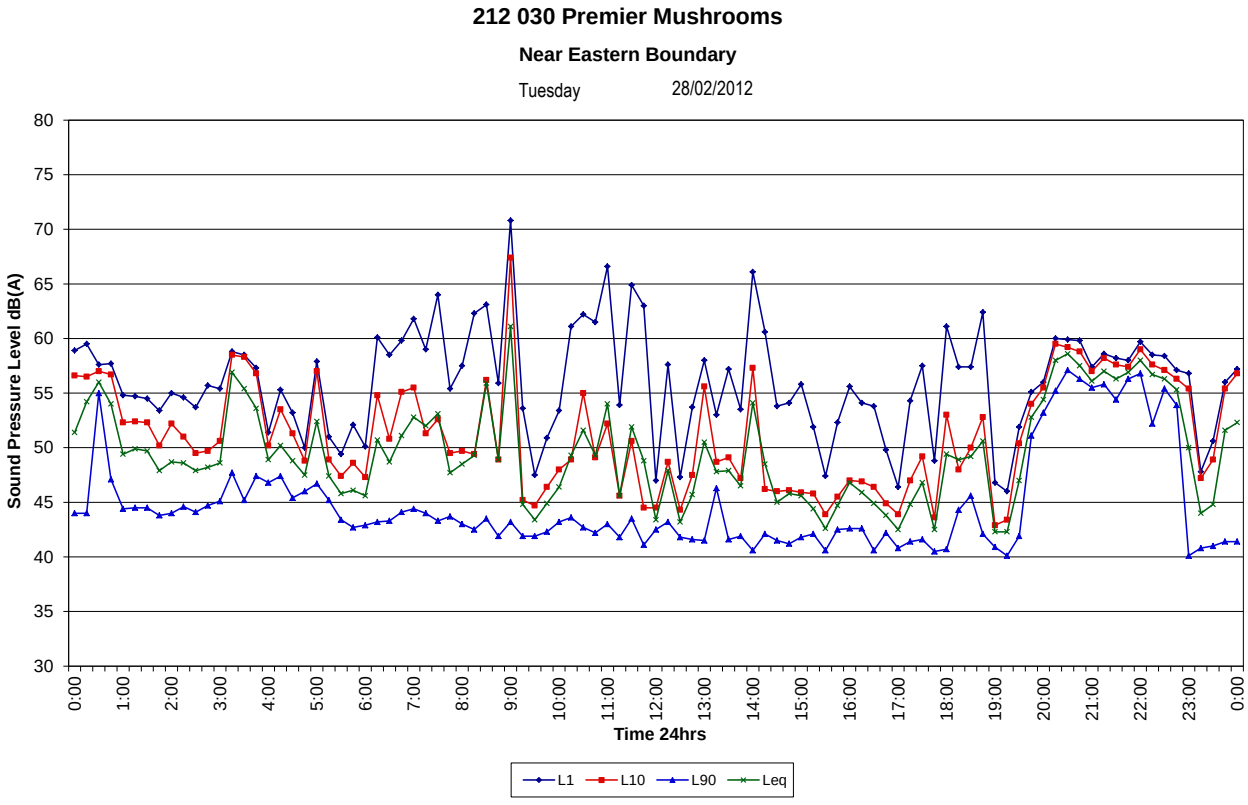
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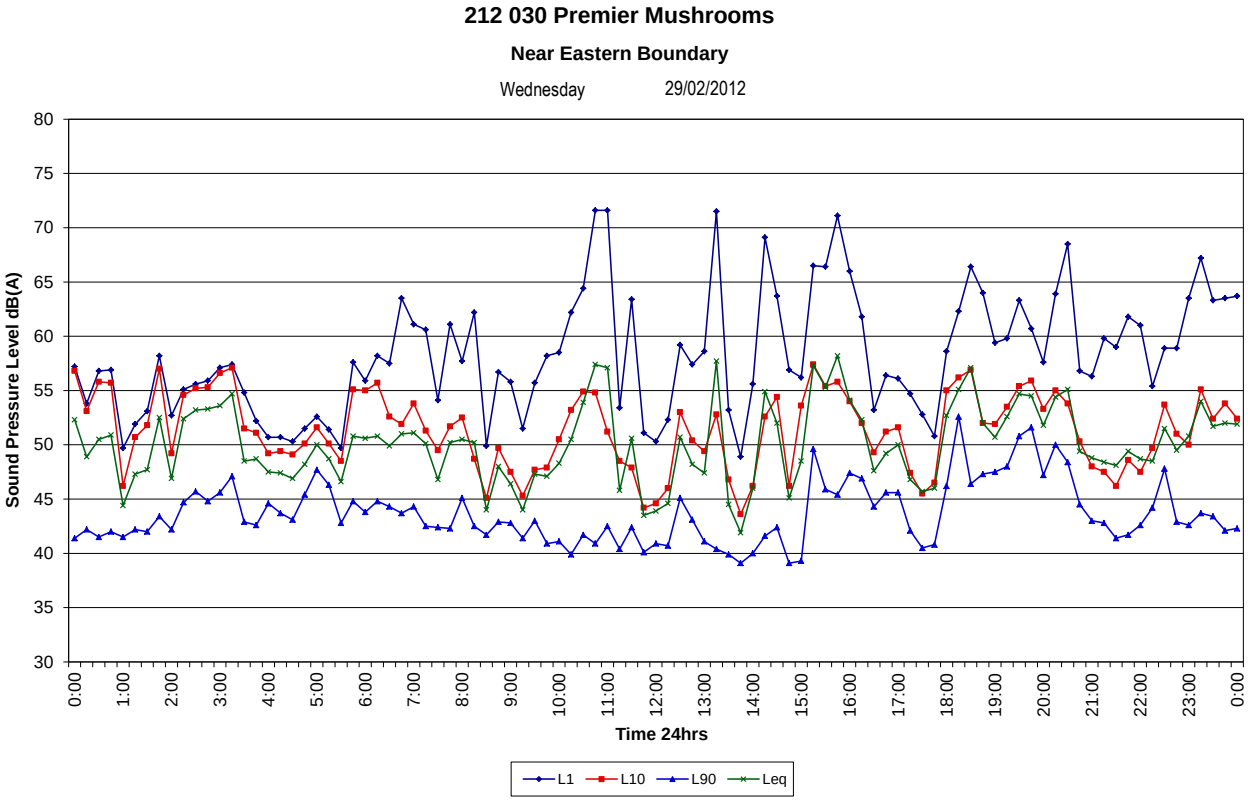
212 030 Premier Mushrooms
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Wednesday 29/02/2012
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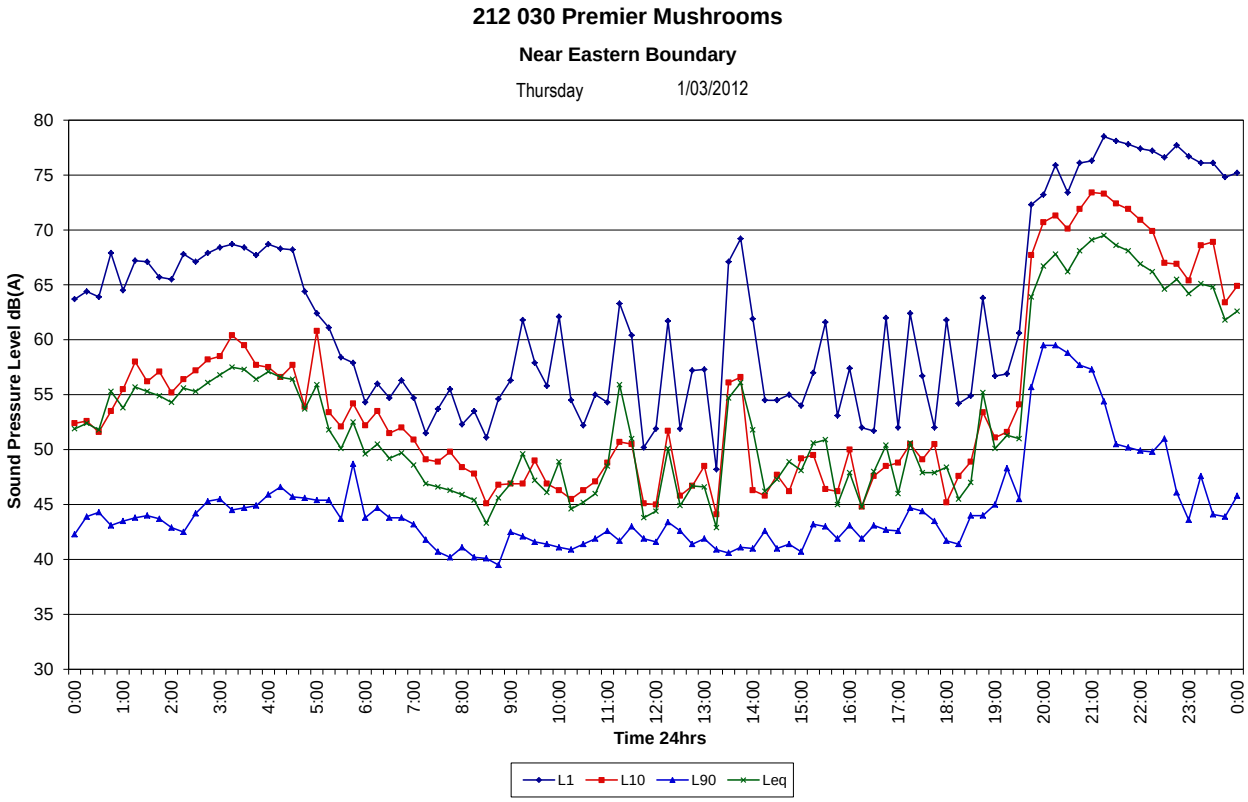
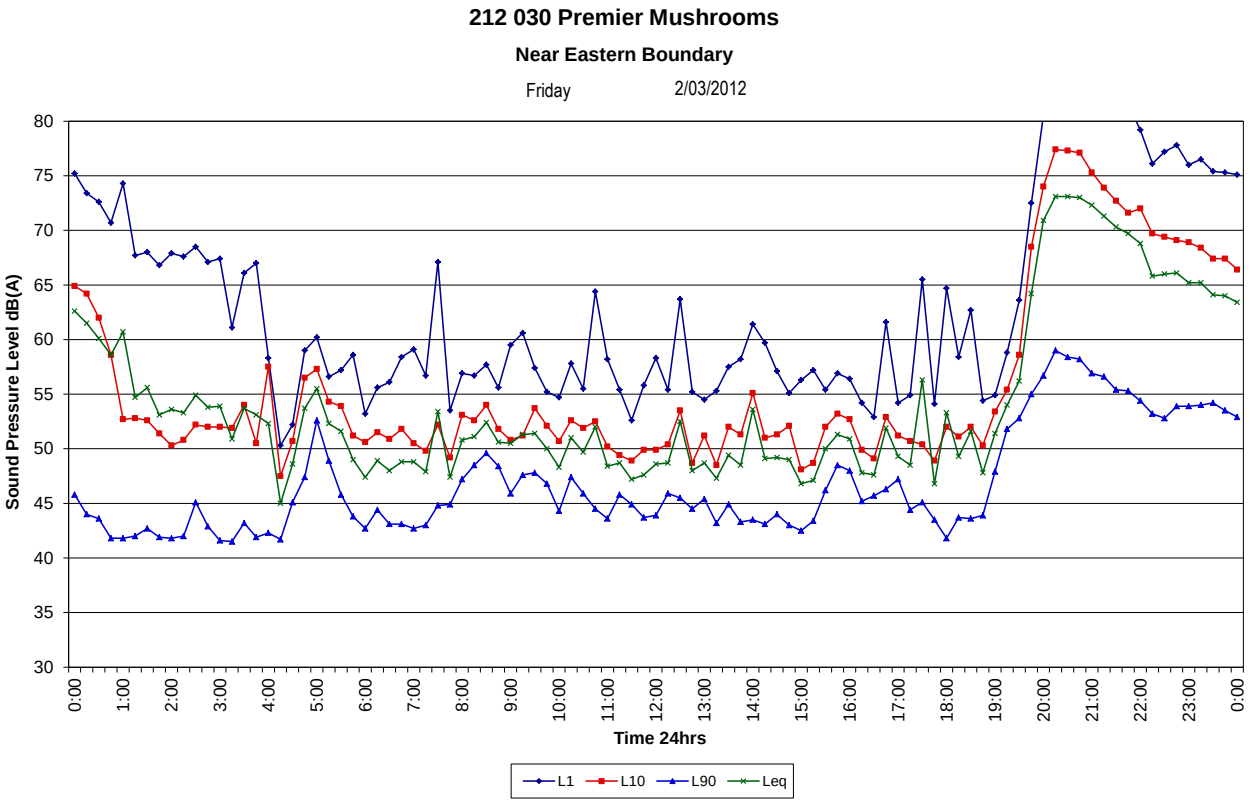
30
0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Time 24hrs
L1 L10 L90 Leq


212 030 Premier Mushrooms
Near Eastern Boundary
Thursday 1/03/2012
Sound Pressure Level dB(A)
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


212 030 Premier Mushrooms
Near Eastern Boundary
Friday 2/03/2012
Sound Pressure Level dB(A)
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
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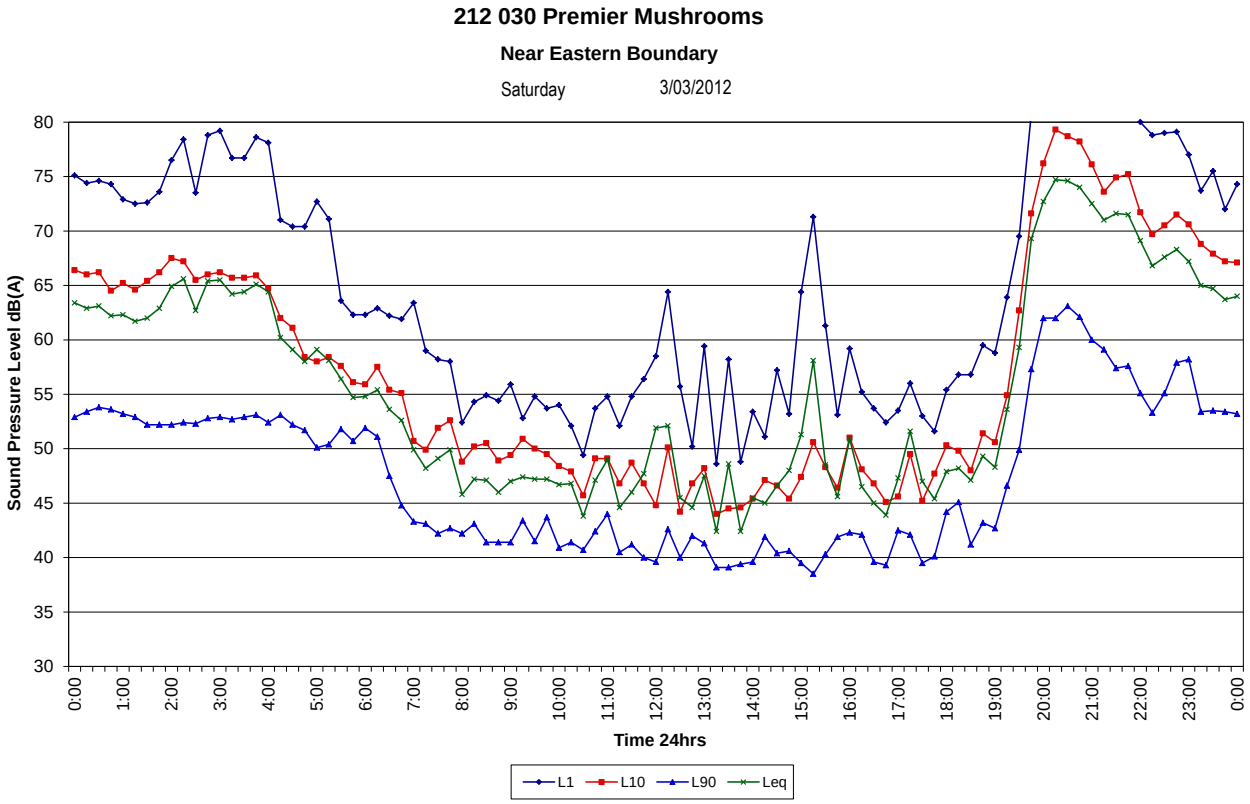
23:00
0:00
Time 24hrs
L1
L10
L90
Leq


212 030 Premier Mushrooms
Near Eastern Boundary
Saturday 3/03/2012
Sound Pressure Level dB(A)
80
75
70
65
60
55
50
45
40
35
30
0:00
1:00
2:00
3:00
4:00
5:00
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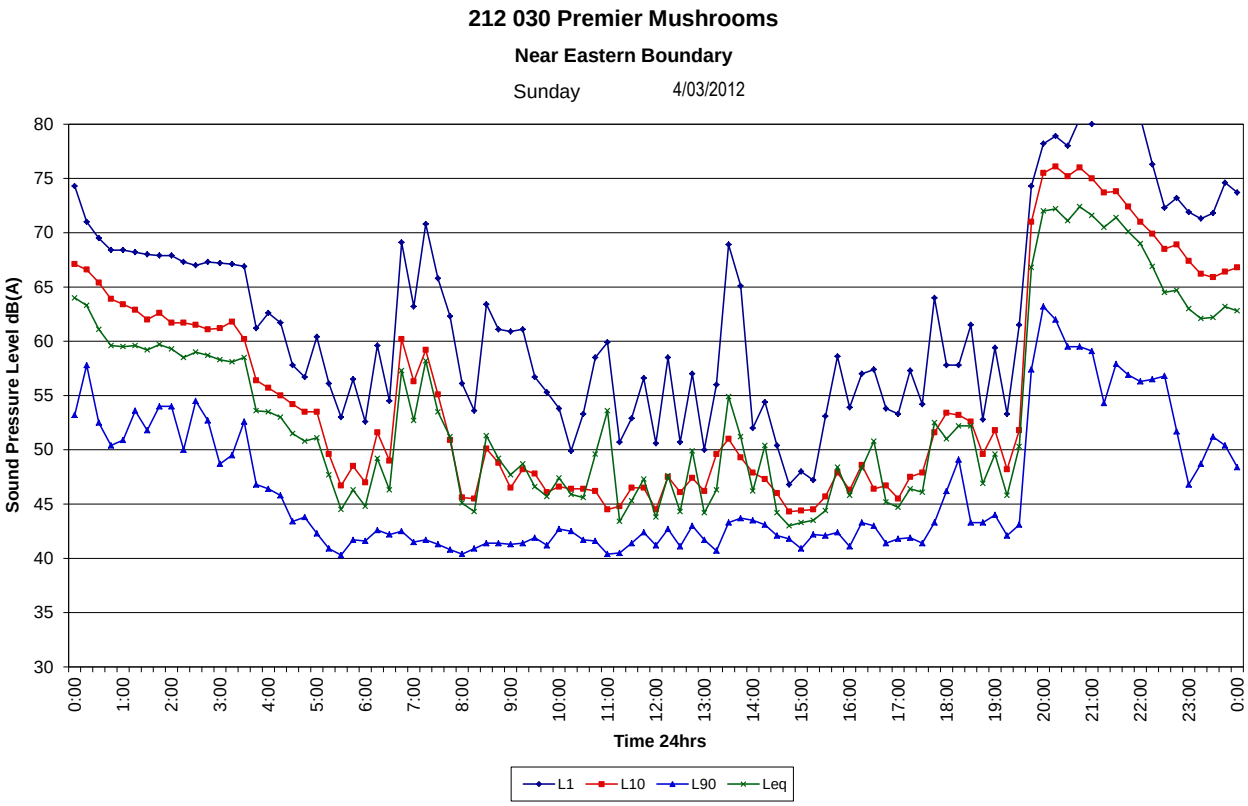
Time 24hrs
L1
L10
L90
Leq


212 030 Premier Mushrooms
Near Eastern Boundary
Sunday 4/03/2012
Sound Pressure Level dB(A)
80
75
70
65
60
55
50
45
40
35
30
0:00
1:00
2:00
3:00
4:00
5:00
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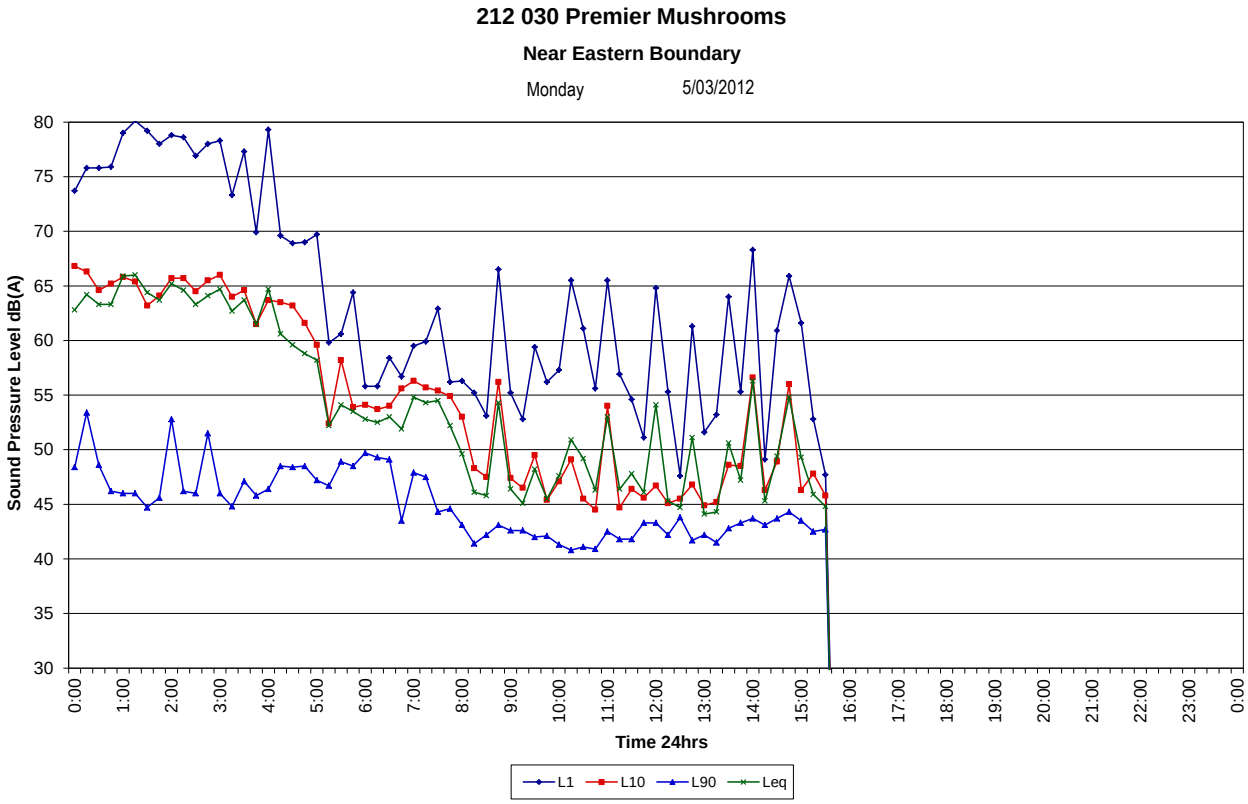
23:00
0:00
Time 24hrs
L1
L10
L90
Leq


212 030 Premier Mushrooms
Near Eastern Boundary
Monday 5/03/2012
Sound Pressure Level dB(A)
80
75
70
65
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50
45
40
35
30
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
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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

APPENDIX C – Glossary of Acoustic Terms

dB – A decibel (dB) is a unit of measurement that represents sound levels. Sound levels are measured by pressure variations in the air. The human ear can perceive a large range of sound levels however it responds to the change in sound levels in a logarithmic fashion, therefore for convenience the decibel is a logarithmic unit of measurement.

dBA or dB(A) – As well as the human ear perceiving sound levels in a logarithmic fashion (see dB) the ear also is more sensitive to high (treble) frequencies than it is to low (bass) frequencies. The "A" in dBA stands for "A-weighting" which applies a correction to certain frequencies to approximate the ear's sensitivity and subjective reaction to how loud a sound is perceived.

Sound Pressure Level – The amount of noise from a source measured at a particular distance.

Sound Power Level – The total amount of noise from a particular source. This is typically calculated at a distance of 1m.

Leq – The level for the overall noise exposure over a specific time. As noise levels fluctuate the Leq represents the energy average if a continuous steady sound was measured. The time intervals stated in this report are typically Leq 15min (15 minutes) and Leq 1hr (60 minutes)

L90 – The noise level exceeded for 90% of the measurement time, or simply the lowest 10% of noise measured. This can be representative of the Background Noise.

Ambient Noise – The combined noise level from all noise producing sources within a given environment

Background Noise – The underlying noise level within the Ambient Noise. This is typically noted as L90 and defined as "the noise level that is exceeded for 90% of the time measured", or simply the lowest 10% of noise measured.

Assessment Background Level (ABL) – The individual background noise level for each period. It is calculated for each period by taking the L90 for each daytime / evening / nighttime periods measured.

Rating Background Level (RBL) – The overall background noise level for each period. It is calculated for each period by taking the median (middle) value from all the daytime / evening / nighttime ABL figures measured.

Receptor (Sensitive Receiver) – Nominated locations surrounding the proposed race tracks which can include residential dwellings, schools, accommodation premises etc. Noise impacts are calculated at the boundary of the nominated receptor except for rural properties where the

boundaries are greater than 30m from the dwelling, in which case the noise impacts are calculated at the most-affected point within 30m of the dwelling.

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