Acous

25 November 2021

Lot 2 DP1252505 - Putta Bucca

Acoustic Assessment for Zoning

Mid-Western Regional Council

Document Control

Acoustik **13 Orana Street,** **Orange NSW 2800**		**Report Ref:**	2109.02.Report.0
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Subject:	Acoustic Assessment for Zoning
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1	
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Tom Harper
Acoustic Consultant - Acoustik

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1 Introduction

Acoustik was engaged by the Mid-Western Regional Council to provide a report on acoustic issues in relation to zoning changes for a parcel of land identified as Lot 2 DP1252505, the site is located on the eastern side of Putta Bucca Road, to the south and the east the site is bounded by the Cudgegong River and Lawsons Creek. There is a concern that the change in zoning and the constructions on the site could impose a burden to control noise from the surrounding developments that does not currently exist.

Putta Bucca House hosts events for weddings and private parties and is located at 74 Putta Bucca Road directly to the North of the site. A concrete batching plant is located on the North Western side of Putta Bucca Road from the site and a sewerage pumping station is on the western boundary of the site.

On the eastern side of the site is the Glen Willow Sporting complex. This area is currently undergoing development. The major facility is the Regional Sports Stadium that can host NRL level sporting events. A road is under construction that will connect the sporting complex to Putta Bucca Road via a bridge to be constructed over Lawsons Creek. A map of the development site and surrounding neighbouring properties is indicated in Figure 1 below.

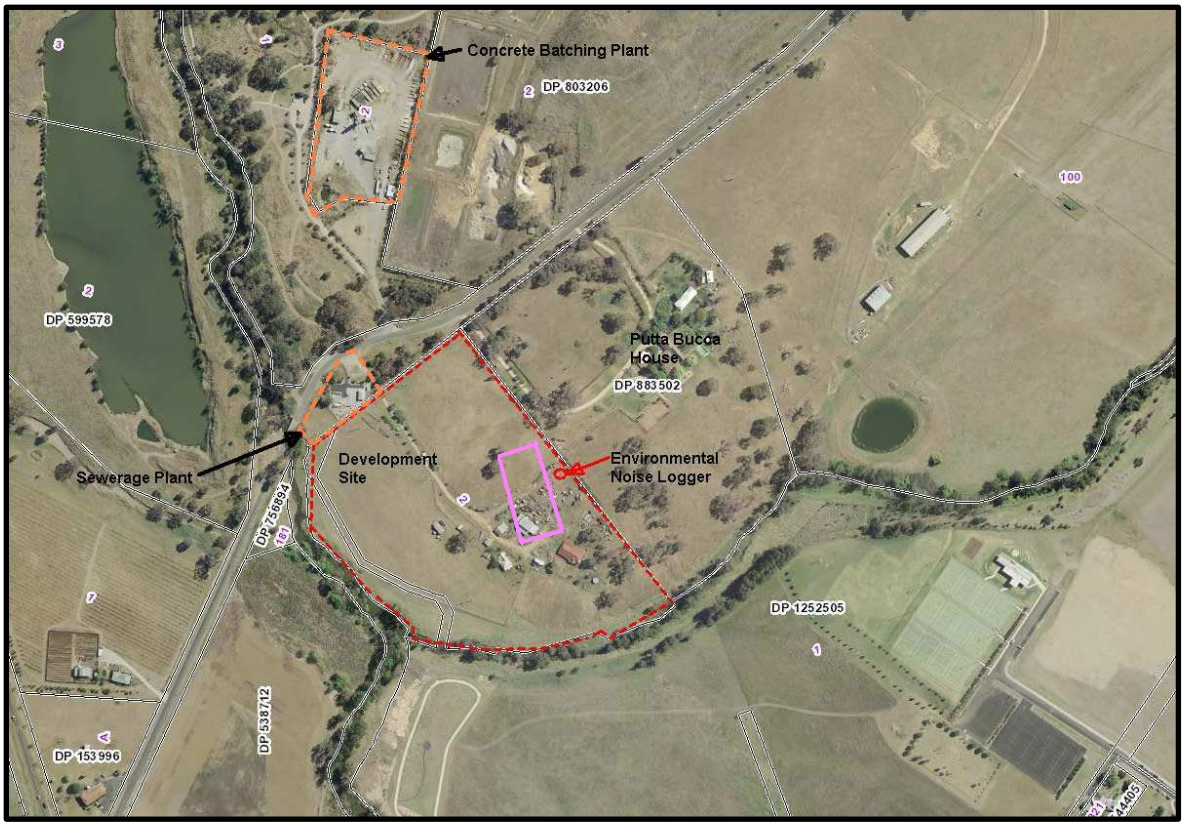


Figure 1: Proposed Site, New sporting Centre indicated in pink, Logger Location indicated with arrow

This study is to determine the acoustic impact of rezoning Lot 2 from RU4 - Primary Production Small Lots to RE1 – Public Recreation. The adjacent Glen Willow sport complex is zoned RE1, and the rezoning of Lot 2 will be extension of the existing sporting and recreation area. The rezoning of the Lot 2 opens the area for recreational use and the construction of a road through the property that will connect Putta Bucca Road directly to the Glen Willow Sporting complex.

There is a planning stage proposal to construct a Centre for women's sport on the site. Preliminary plans indicate that the Centre will consist of three buildings, two being accommodation blocks (Buildings A and B) and the third a common building (building C) housing a dining/lounge, Lecture theatre and a gymnasium.

Specifically, the study will address noise emissions from the surrounding developments that could affect the womens sports centre. The activity at the sports centre is predominantly residential in nature.

1.1 References

The following reference material was consulted while preparing this report:

- NSW EPA Noise Guide for Local Government 2013
- NSW Environmental Protection Authority (EPA) Noise Policy for Industry (NPI)

1.2 Glossary

A short list of acoustic terms is included below:

$L_{Aeq, X\ min(s)}$: is the Sound Pressure Level (SPL) in decibels (dB), equivalent to the total sound energy over the measurement period of X minutes (or the energy average). The A signifies that an A-Weighting applied to the spectrum to simulate human hearing response

L_{Amax}: is the maximum Sound Pressure Level (SPL) in decibels (dB) that occurs during a measurement

L_{A90}: is the noise level exceeded for 90% of the measurement period, calculated by Statistical Analysis, it is considered to represent the background noise level or the noise that is present for most of the time

L_{A01}: is the noise level exceeded for 1% of the measurement period, calculated by Statistical Analysis, it is considered to represent close to the maximum noise level

L_{Ceq}, dBC or C-weighting: C-weighting is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range

Intrusive noise: is noticeably louder than the background noise and considered likely to disturb or interfere with those who can hear it. Depending on the nature of the noise source it is defined as:

a) L_{A90} + 5 dB for noise sources that are continuous in nature for extended periods or all day and night typical of industrial or residential sources that are a permanent fixture.

b) L_{A90} + 10 dB for noise sources that are temporary in nature like construction where the activity is limited to day time operation some elements of the noise may be continuous.

2 Noise Measurements

Environmental measurements were made at the Northern Edge of Lot 2 as indicated in Figure 1.

The noise logger was placed close to the boundary with Putta Bucca House (74 Putta Bucca Road) as Putta Bucca House and its operations as an entertainment venue are the affected residential noise receiver to Lot 2. The microphone was in an open field environment with minimal reflecting surfaces nearby.

2.1 Environmental Noise Levels

Environmental noise logging was conducted at both locations from Wednesday 27 October to Saturday 6 November 2021. Ten (10) days of continuous noise logging. During the logging period there was periods of wind and rain that have been accounted for in the results below.

Noise Logging Results have been analysed to exclude periods where wind or rain has adversely affected results. Where wind speeds continually exceeded 5 m/s or rain is detected the acoustic data is analysed to determine if results are affected, affected results are marked "invalid".

For the 10 days of logging 6 full days of valid noise logging was obtained for most day/evening/night periods. All night periods of logging are valid.

Summaries of the logging results are presented in **Error! Reference source not found.** below.

Table 1: SVAN 958A Noise Logger Sn:59161 – Lot 2 DP1252505 Mudgee NSW

	Day 7am – 6pm		**Evening 6pm – 10pm**		**Night 10pm – 7am**	
	L_{A90}	**L_{Aeq}**	**L_{A90}**	**L_{Aeq}**	**L_{A90}**	**L_{Aeq}**
Wednesday, 27 October 2021	Blanks	0.0	32.3	51.0	27.2	42.0
Thursday, 28 October 2021	36.4	49.6	32.6	39.7	26.6	41.9
Friday, 29 October 2021	Invalid	Invalid	Invalid	Invalid	26.0	44.2
Saturday, 30 October 2021	33.2	46.6	31.1	43.5	26.0	39.0
Sunday, 31 October 2021	31.5	44.9	28.1	38.9	24.7	43.1
Monday, 1 November 2021	32.5	46.8	31.4	43.6	26.3	51.4
Tuesday, 2 November 2021	34.7	46.3	33.7	43.8	28.0	48.0
Wednesday, 3 November 2021	34.0	46.5	32.0	39.7	26.6	38.3
Thursday, 4 November 2021	Invalid	Invalid	Invalid	Invalid	25.3	38.2
Friday, 5 November 2021	Invalid	Invalid	Invalid	Invalid	26.8	39.6
RBL/Ambient	**34 (35[*])**	**47**	**32**	**42**	**26 (30[#])**	**45**

Note[*]: The day RBL will be set at 35 dBA the default minimum value for day

Note[#]: The night RBL will be set at 30 dBA the default minimum value for night

Note: Morning shoulder period (5 am to 7 am) ambient noise levels increase along with the increases in early morning traffic. An analysis of the morning shoulder period indicates an RBL of 35 dBA for the early morning shoulder period

3 Project Noise Criteria

The NSW EPA released the Noise Policy for Industry (NPI) in late 2017 will be used to guide the acoustic assessment. Noise levels generated on the site due to operations of a sports training centre with accommodation facilities will be assessed against the NPI requirements.

Road traffic generation due to the operation of the site as a sporting facility will be assessed against the NSW Road Noise Policy (RNP).

Construction on the site would generate noise levels that could affect residential and business operations. The NSW DECC 2009 Interim Construction Noise Guideline (ICNG) will be outlined regarding permissible noise levels during construction works.

3.1 Environmental Noise Triggers

The NPI assessment is based on the establishment of trigger levels; if noise levels exceed the trigger a noise management response is required that includes all reasonable and feasible mitigation measures and an assessment of the impact of any residual noise that continue to exceed trigger levels. The final level of acceptable noise is determined by the regulatory authority balancing the noise impact against other social and economic benefits.

The NPI employs two measures to control noise so that residential acoustic amenity is protected. The first is the intrusive noise trigger (L_{A90} background (RBL) + 5dB) and the second is the amenity level based on the type of area.

Acoustik consider that the residential noise receivers near Lot 2 are in a Rural residential area as defined in the NPI, the existing zoning of the area is (RU1-Primary Production or RU4 -Primary Production Small Lots). Land to the south and east of the Lot 2 is not residential and is zoned E3 – Environmental management and RE1 – Public Recreation respectively.

The amenity level is designed to halt the increase of background levels due to continuing development and to control noise emissions affecting a community from the total industrial noise. The Project Amenity noise level limits the noise emissions from any one site and is equal to the Recommended Amenity Noise Level (re Table 2.2 of NPfI) minus 5 dB plus 3 dB to convert the amenity limits to 15 minute assessment periods.

Acoustik have noted that the environmental noise logging indicates that the ambient noise levels in the early morning from 5 am to 7 am increase significantly due to local traffic and early morning activity in the area. Therefore, a morning shoulder period RBL will be calculated to reflect the increased ambient noise levels during the early hours of the day before the normal day period from 7 am (8am on Sundays and Public Holidays). The RBL for these periods are calculated based $L_{A90,\ morning\ shoulder}$ and using an average of the night and day amenity noise criteria. Graphical plots of the morning shoulder periods are included in Appendix A.

The project noise trigger levels are detailed in **Error! Reference source not found.** below.

Table 2: Proposed Noise Trigger Levels – Residential and other noise receivers – Rural Residential

Area	Intrusive Level L_{A90} + 5 dB	Project Amenity Noise Urban Residential	**Noise Trigger dBA**
Day 0700 – 1800	40	48	**40**
Evening 1800 – 2200	37	43	**37**
Night 2200 – 0700	35	38	**35**
Morning Shoulder 0500 – 0700	40	43	**40**
Commercial Premises	During Use - Not dependant on Intrusive Level		**65**
Active Recreation – Parks	During Use - Not dependant on Intrusive Level		**55**
Passive Recreation – Parks	During Use - Not dependant on Intrusive Level		**50**

3.2 Maximum Noise Level Triggers – Sleep Disturbance

Sudden Loud noise events can interrupt sleep by awakenings and disturbance to sleep stages. The following trigger levels to address sleep disturbance are set in section 2.5 of the NPI.

The site sports facility is unlikely to conduct any activity during the early morning but if any did occur an assessment of sleep disturbance would be required.

> *"Where the subject development/premises night-time noise levels at a residential location exceed:*
>
> - *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
> - *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*
>
> *A detailed maximum noise level event assessment should be undertaken.*
>
> *The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period."*

The assessment should address frequency of occurrence, and the distribution of events over the night time and any change in environmental noise levels over the night (10 pm to 7 am)

The primary noise level parameter is L_{AFmax} and the assessment should consider all feasible and reasonable noise mitigation measures to achieve the maximum noise triggers.

3.3 Noise Criteria – Road Traffic

The NSW Road Noise Policy (RNP) provides assessment criteria for increased road noise due to the development. The criteria are based on 15 hour (7 am – 10 pm) and 9 hour (10 pm – 7 am) assessment periods and a 1 hour assessment for special use developments like classrooms or religious buildings. There is no special use development that are likely to be affected by traffic generation on the site.

The traffic noise criteria for residential noise receivers are listed in Table 3 below.

Table 3: Road Traffic Assessment for residential land users (Table 3 from NSW RNP)

Road Category	**Type of Project/Land Use**	**Assessment criteria – dBA**	
		Day (7 am-10pm)	**Night (10 pm-7 am)**
Freeway/Arterial/ sub-arterial roads	Existing residents affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,\ 15\ hour}$ 60 external	$L_{Aeq,\ 9\ hour}$ 55 external
Local roads		$L_{Aeq,\ 15\ hour}$ 55 external	$L_{Aeq,\ 9\ hour}$ 50 external

3.4 Noise Criteria – Construction

The NSW DECC 2009 Interim Construction Noise Guideline (ICNG) will be used to guide the construction noise assessment.

Within standard construction hours the Noise Affected Level control is RBL background + 10 dB and then a Highly Noise Affected Level of 75 dBA. Outside of standard hours the Noise Affected Level is RBL background + 5 dB. Non-residential land users are protected with set noise limits. The ICNG construction management noise levels are summarised in Table 4 below.

Table 4: Summary of ICNG Construction Noise Management Levels

Time	**Management Level ($L_{Aeq, 15\ min}$)**	**Application (refer Appendix B for full application details)**
Residences North of site Putta Bucca House Standard hours Monday to Friday 7 am to 6 pm Saturday 8am to 1 pm No work on Sundays or public holidays	Noise Affected 45 dBA	This level represents the point above which there may be some community reaction to noise.
	Highly Affected 75 dBA	This level represents the point above which there may be strong community reaction to noise
Outside standard hours	Noise Affected Evening 40 dBA Night 35 dBA	A strong justification would typically be required for works outside the recommended standard hours
Industrial Premises	External 75 dBA	During occupation
Commercial Premises	External 70 dBA	During occupation
Active Recreation Areas	External 65 dBA	During use
Passive Recreation Areas	External 60 dBA	During use

4 Noise Predictions

Noise generated by the existing developments is predicted using an iNoise model

The following sites are possible sources of noise that could impact the acoustic amenity of guests staying that the womens sports centre:

1. Wedding and other social events held at Putta Bucca house – 74 Putta Bucca Road
2. The concrete batching plant located at 69 Putta Bucca Road
3. Sewerage pumping plant on the western boundary of lot 2 adjacent to Putta Bucca Road
4. Sporting events at the Glen Willow Sporting Complex

Weather Induced Noise-Enhancement

The NPI generally requires that Noise-enhancing meteorological conditions are considered for noise modelling predictions. In this case all the predicted noise levels made with the iNoise program are within distances of less than 280 m. At these distances, there is insignificant enhancement due to weather effects, so it was not included in the modelling results.

4.1 Putta Bucca House

Putta Bucca House is an historical dwelling that hosts weddings and social events. The significant noise generation on the site will be from events that are held in a building that has solid concrete walls on the Southern, Eastern and Western sides. The roof of the building is canvas.

Based on similar outdoor events Acoustik have calculated noise emissions from the canvas roof building for general crowd noise including two applause events and speeches by a single person using a speech reinforcement system or general noise from a crowd of up to 100 people. The prediction is based on a 15 minute average L_{Aeq}.

The predicted noise levels at the façade of the accommodation blocks of the sporting centre indicate noise levels of 49 dBA which exceeds the trigger levels for day and evening periods. Acoustik propose a change to the orientation of the buildings so that the amenities block C is located closest to Putta Bucca House and is used to protect the accommodation blocks from the event noise levels. The alternative orientation of the buildings reduces the noise levels affecting the accommodation blocks to 36 dBA or less.

The utility building containing the common areas is non-residential and not subject to the residential trigger levels. The trigger level listed in Table 2 above for passive recreation is more applicable to the outdoor areas around the Block C and 49 dBA does not exceed the passive recreation trigger of 50 dBA. Additionally, the lecture theatre and dinning areas of Block C can be constructed to reduce internal noise to acceptable levels.

Amplified music noise emissions from events at Putta Bucca House are not predicted but based on experience could generate noise levels up to 20 dB louder. The selection and use of good quality sound reinforcement equipment can direct sound away from sensitive noise receivers so that amplified music does not spill over to residential areas. The operator of Putta Bucca House should choose equipment that reduces the impact of events on neighbouring properties.

The noise contour maps are presented in Appendix B.

4.2 Concrete Batching Plant – Boral Concrete

Noise predictions from the batching plant are based on generic data included with the iNoise modelling program. The plant operates from 6:30 am to 5:30 pm and on Saturdays from 6:30 am to 12:30 pm.

Noise contour plots of the noise emissions from the batching plant are included in Appendix B.

The predicted noise levels close to the proposed womens sporting centre do not exceed the day and morning shoulder trigger levels. Acoustik note that the predicted noise levels are based on when the plant is batching at other times noise levels would be considerably less.

4.3 Sewerage Pumping Station

The sewerage pumping plant is located near to the Putta Bucca Road entrance of Lot 2. The pumps and other noise generating equipment is located inside a building. Noise from the pumping station is not expected to disturb any guests at the proposed womens sporting centre.

4.4 Glen Willow Sporting Complex

The Glen Willow Sporting Complex is a large area of sporting fields, including netball courts and the Regional Sports Stadium these facilities are 430 m and 800 m from the womens sporting complex respectively.

Netball operates during the day and noise generated by the games varies widely depending on the number of participants. Considering the connection that guests at the sports centre would have with community sport it is unlikely that noise generated by netball would be annoying and due to the distance from the netball courts noise levels could be audible but not likely to be intrusive nor would the source of the netball noise levels be a persistent annoyance.

Larger events held at the Regional Sports Stadium would be planned and managed organisers that are required to submit a management plan to includes control of noise emissions.

4.5 Noise Generation due to Womens Sporting Centre

The general operation of the sporting centre will be predominately residential but and like the operation of a hotel with conferencing facilities. The primary sources of noise are from the following:

1. Patron noise from guests congregating in the common areas
2. Mechanical services noise servicing the air-conditioning accommodation and facilities and kitchen exhaust from block C
3. Traffic noise generation associated with the sports centre operation

All adjacent noise receivers to Lot 2 are currently non-residential noting that Putta Bucca House could return a residential dwelling in the future.

At this time Putta Bucca house would not be adversely affected by noise from the operation of the Sports Centre assuming that reasonable steps are taken to control noise emissions from mechanical plant servicing the Sports Centre

Traffic noise levels on Putta Bucca road could be increased due to site traffic noise generation, thus the traffic noise criteria are provided for future studies or extensions to this report. Additional information about the development and current traffic levels on Putta Bucca Road would need to be know to complete this study.

5 Recommendations

Acoustik's recommendation based on the above study is that the orientation of the Womens Sporting Centre is considered so that the non-residential buildings in the development can be used to protect the residential parts from noise emissions at Putta Bucca House.

Appropriate acoustic treatments need to be applied to mechanical plant servicing the Womens Sporting Centre.

The selection and use of quality sound reinforcement equipment used at Putta Bucca House will reduce the level of amplified noise spilling over to the accommodation areas of the sporting centre.

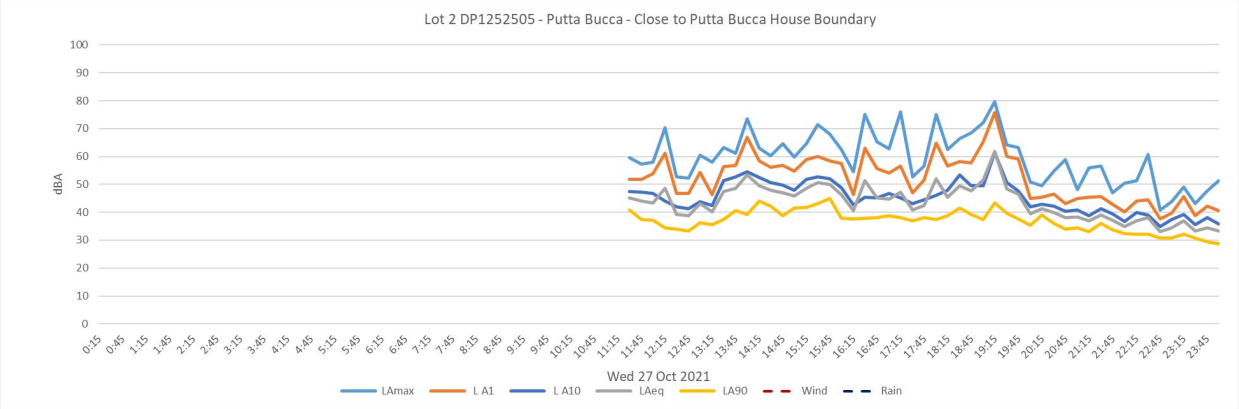
6 Conclusion

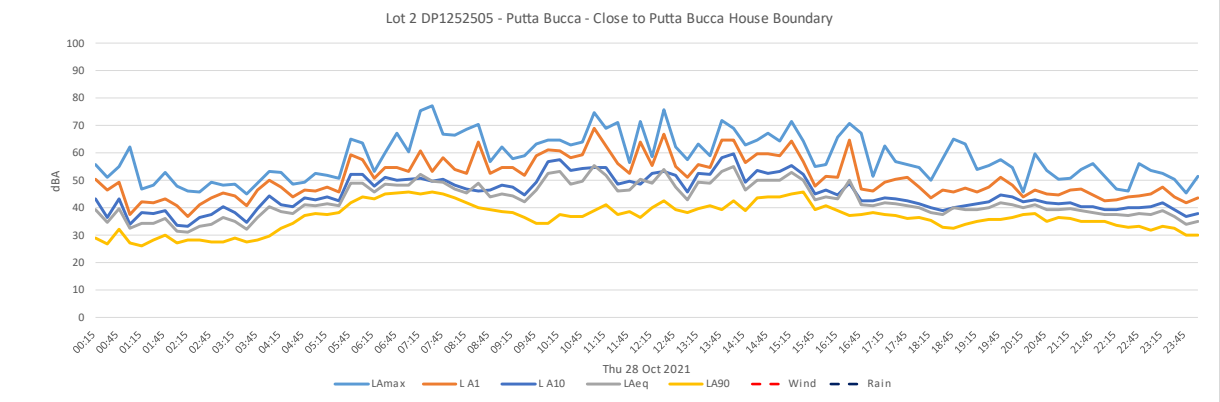
Acoustik was engaged by the Mid-Western Regional Council to provide an acoustic report for the affect of changing the zoning of the existing parcel of land at Lot 2 DP1252505 - Putta Bucca. And an initial assessment for the construction of a Womens Sporting Centre on the same site.

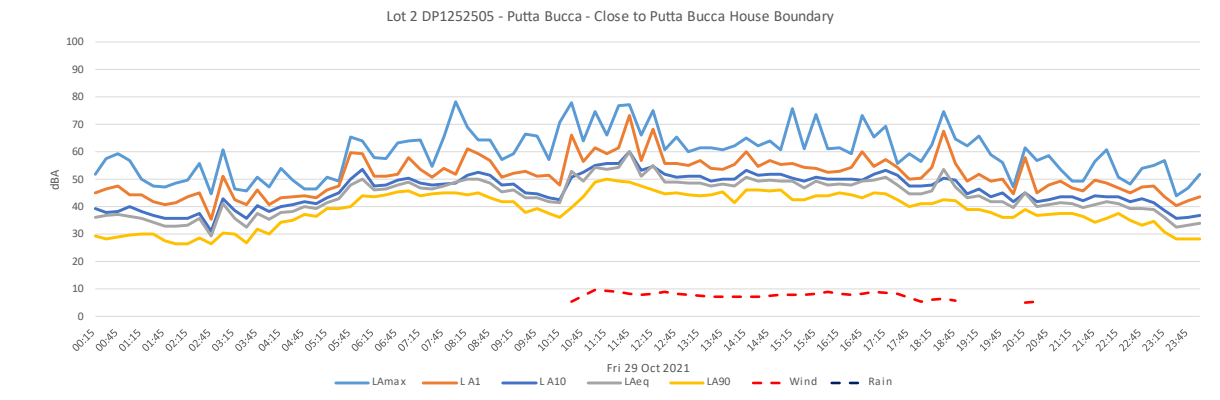
Acoustik have conducted an assessment predicting noise levels that could affect the proposed sporting centre and included recommendations to control the impact of noise.

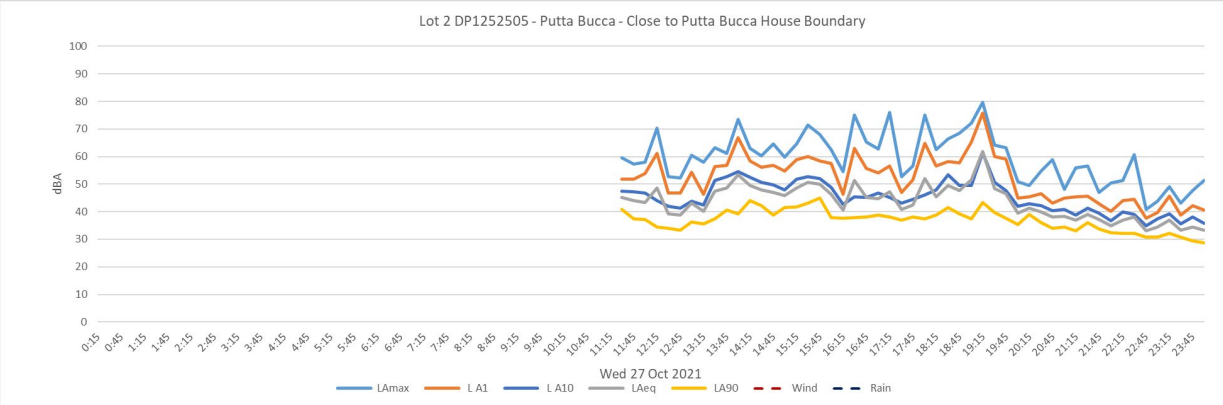
A. Appendix A –Noise Logging Results

Environmental Noise logging levels





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Wed 27 Oct 2021
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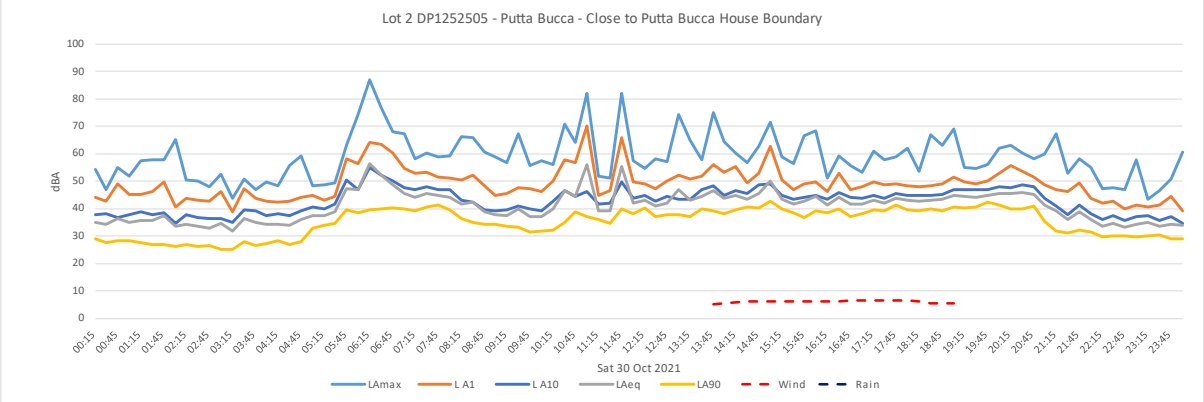
Rain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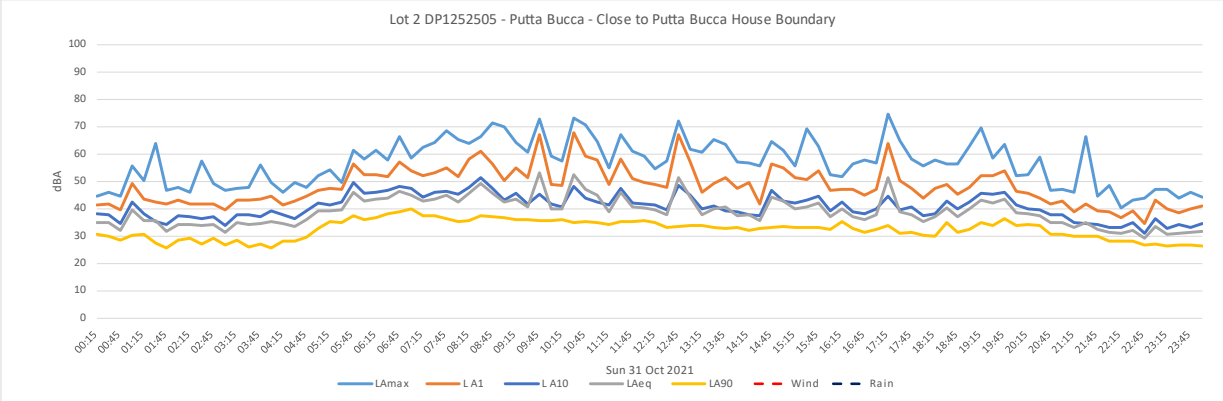
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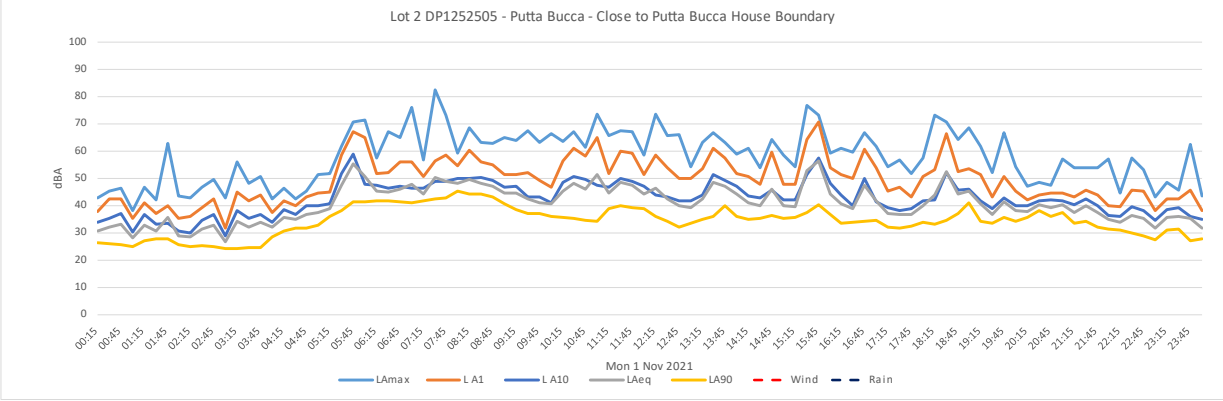
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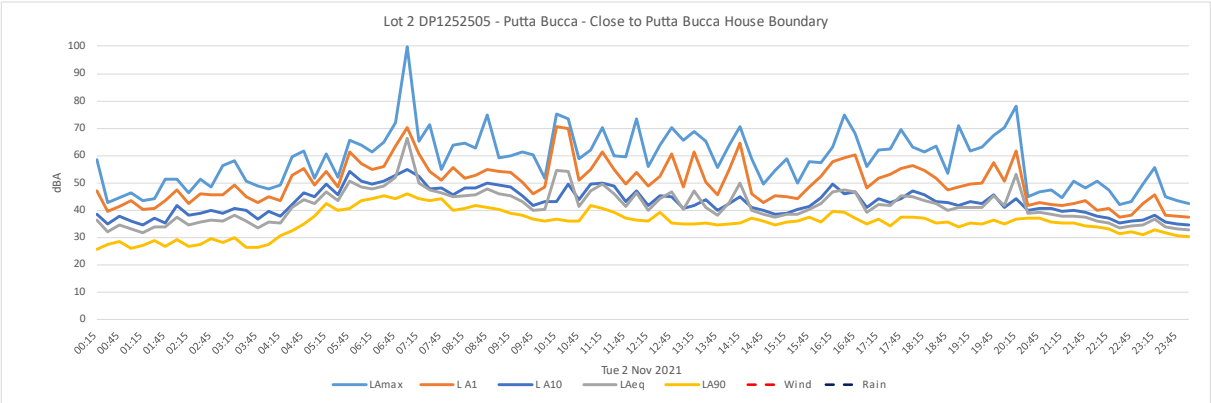
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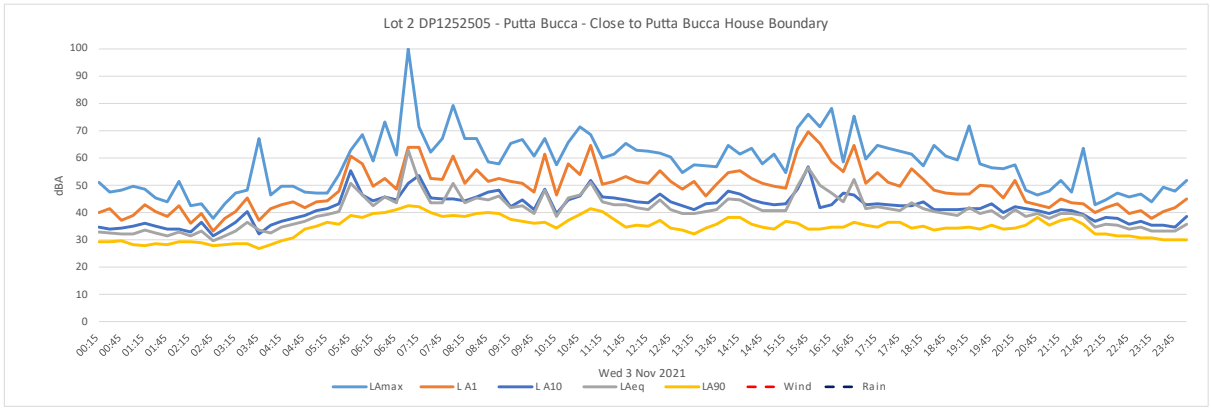
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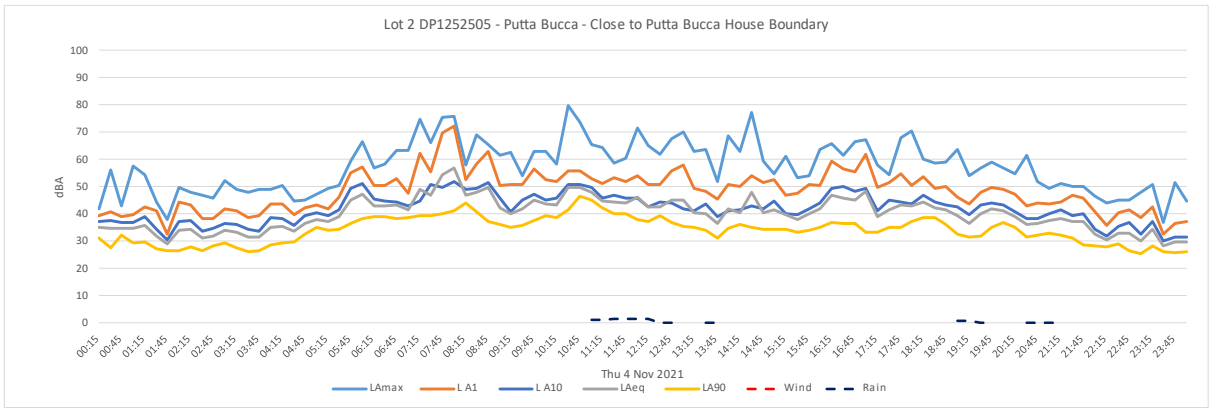
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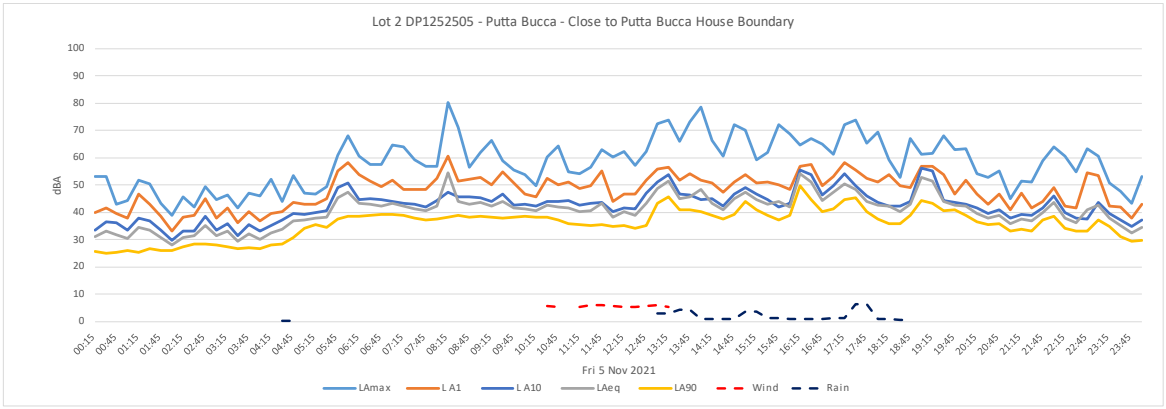
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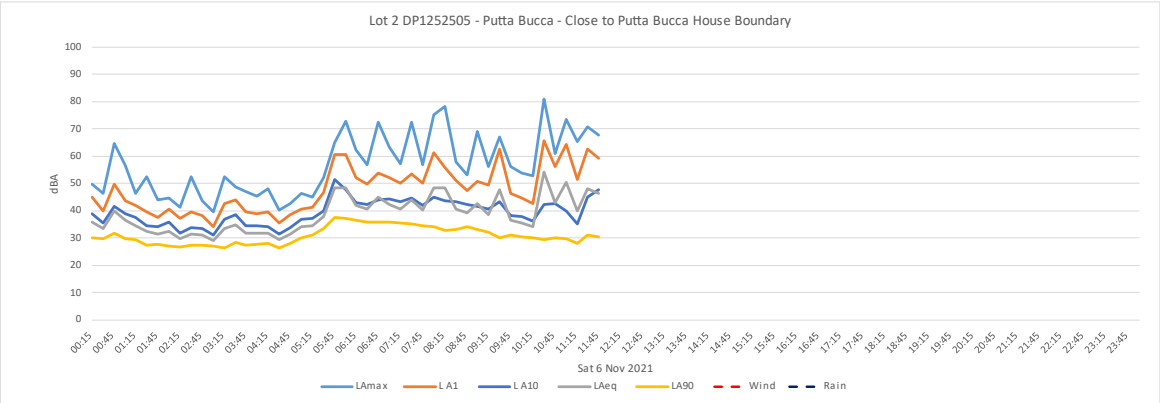
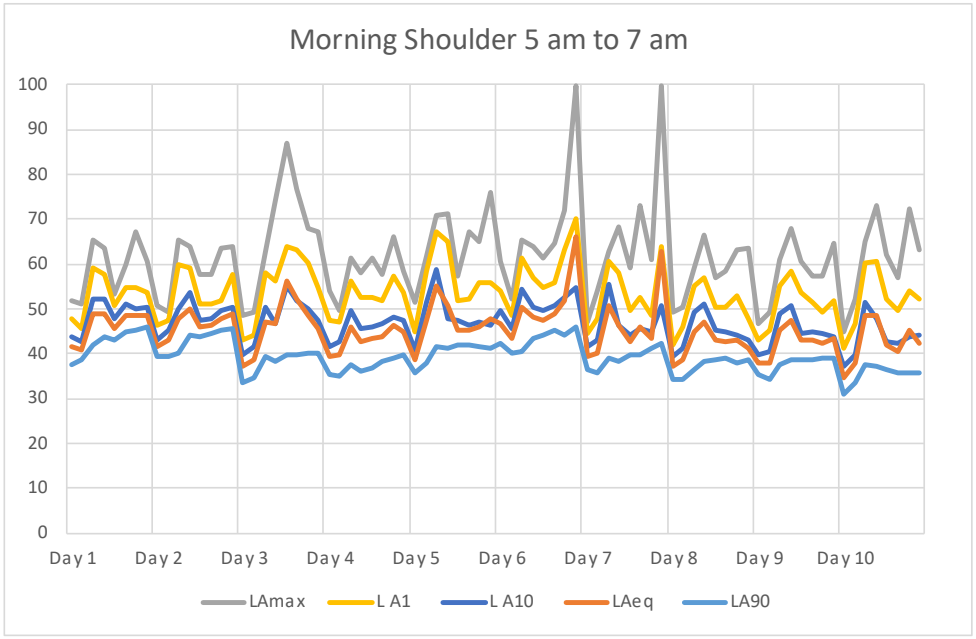
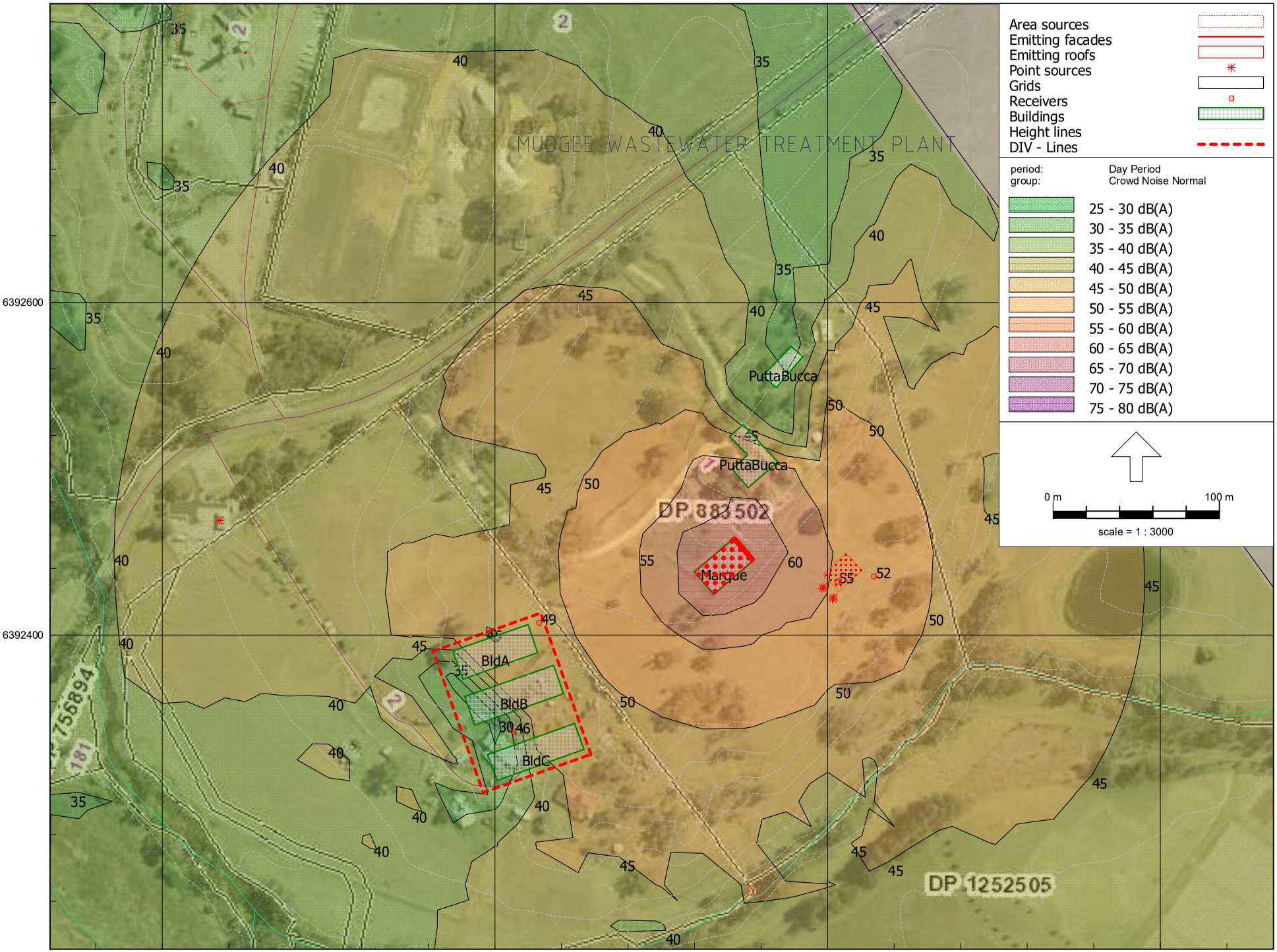


Morning Shoulder Plot



B. Appendix B – Contour Noise Maps

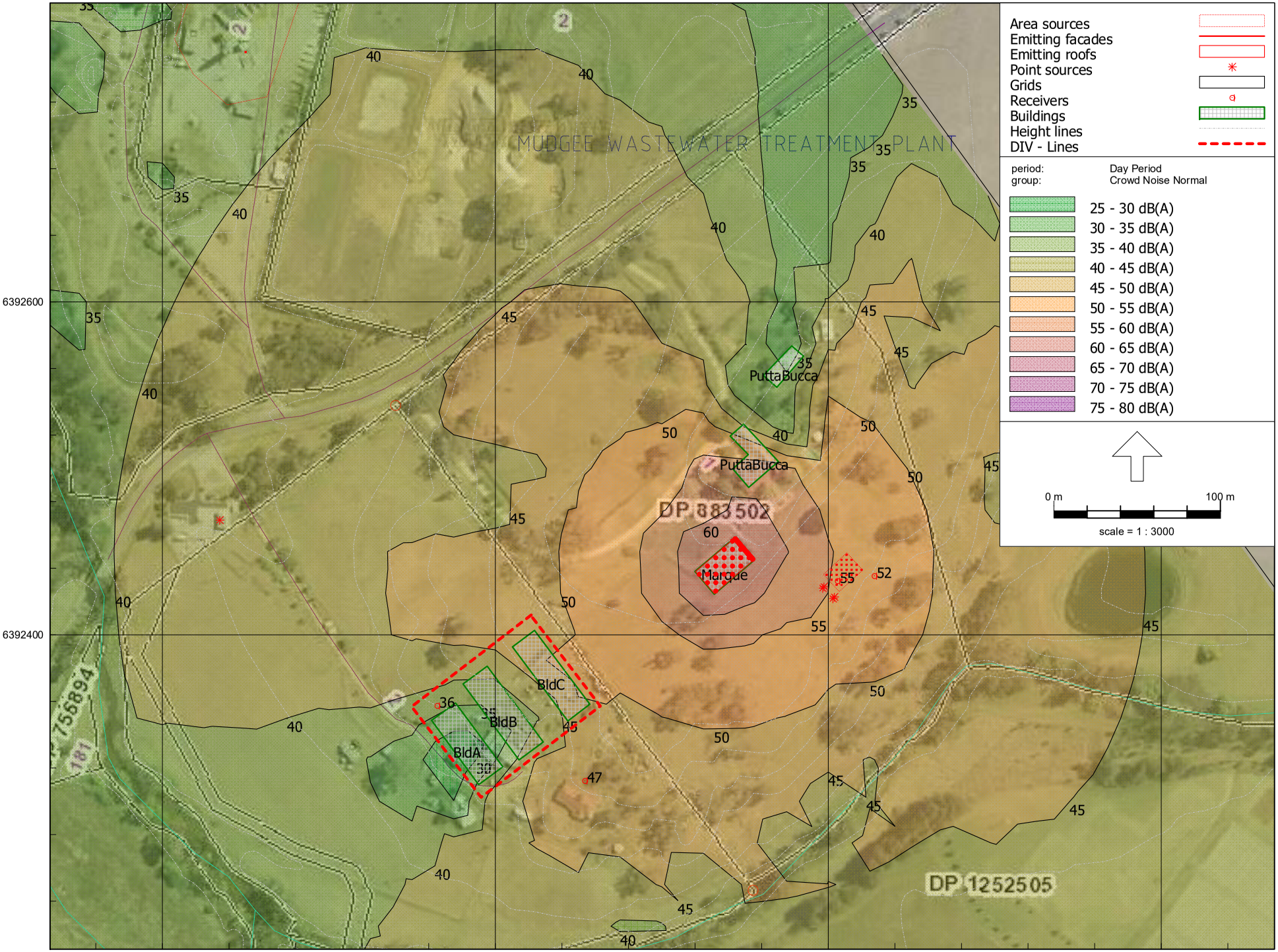
Noise Contour Maps from iNoise



Putta Bucca - Event in Marque Building

Tom Harper - Acoustik

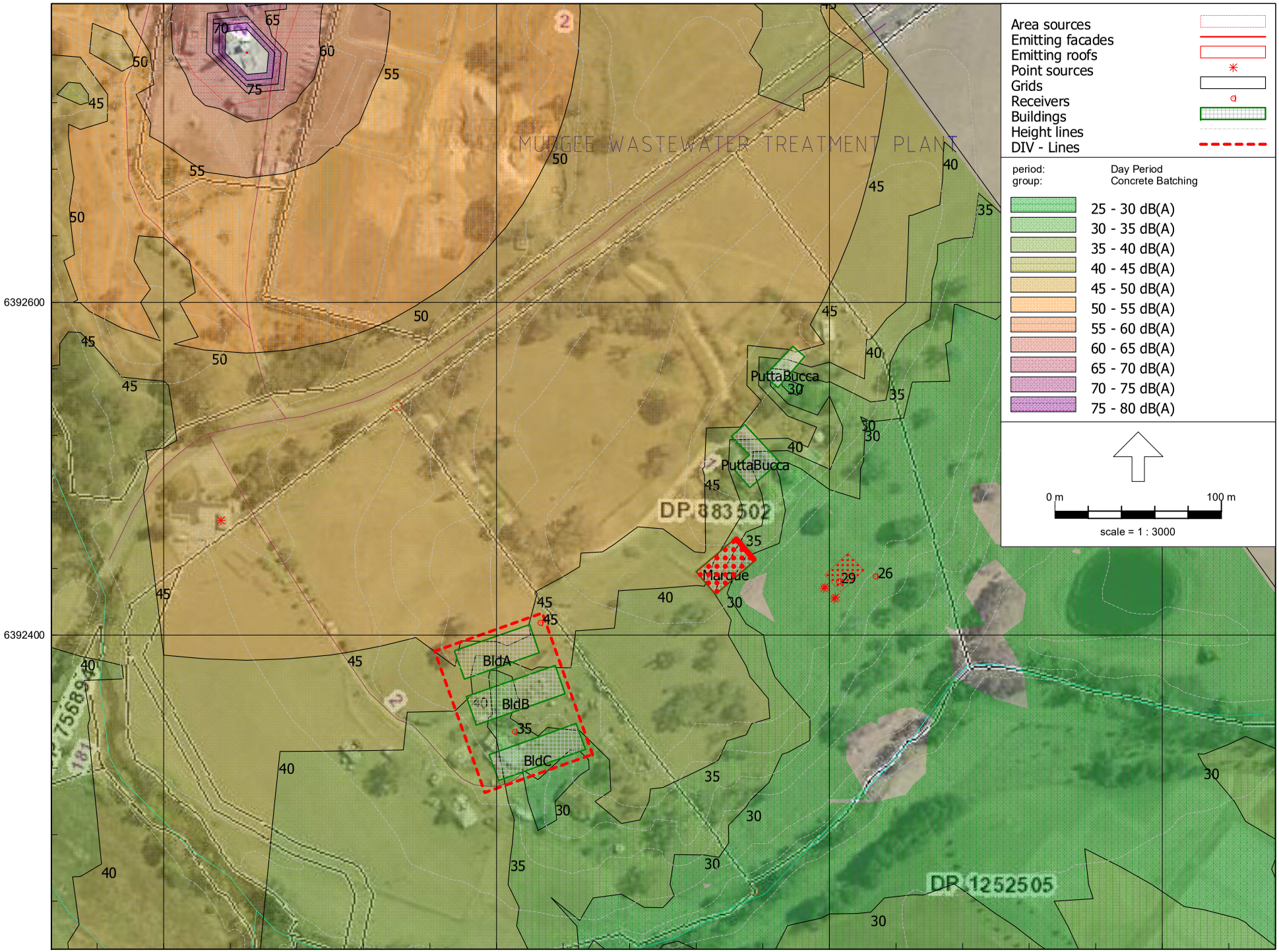
Industrial noise - ISO 9613.1/2, [version of Area 1 - initial model] , iNoise V2021 Free Licensed to Tom Harper - Acoustik



Putta Bucca - Event in Marque building - Rotate Sports Centre

Tom Harper - Acoustik

Industrial noise - ISO 9613.1/2, [version of Area 1 - Alternative Orientation of Sports Centre] , iNoise V2021 Free Licensed to Tom Harper - Acoustik



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Batching Plant during Operation

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