acousticdynamics

SSD10399 Prospect Logistics Estate
Peer Review & Acoustic Assessment
Clunies Ross Street Greystanes, NSW

Client:
ISPT Pty Ltd

Association of Australasian Acoustical Consultants

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acousticdynamics

Sydney Head Office
Suite 2
174 Willoughby Rd
St Leonards NSW 2065
T: 02 9908 1270

Melbourne Office
Suite 11
70 Racecourse Rd
Nth Melbourne VIC 3051
T: 03 7015 5112

ABN: 36 105 797 715
PO Box 270
Neutral Bay NSW 2089
E: info@acousticdynamics.com.au
W: www.acousticdynamics.com.au

Association of Australasian Acoustical Consultants

Client	ISPT Pty Ltd
Contact	Mr David Lousick
Address	Level 53 Governor Phillip Tower, 1 Farrer Place Sydney, NSW
Mobile	0433 396 263
Email	dlousick@aliro.com.au

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GLOSSARY

NOISE

Noise is produced through rapid variations in air pressure at audible frequencies (20 Hz – 20 kHz). Most noise sources vary with time. The measurement of a variable noise source requires the ability to describe the sound over a particular duration of time. A series of industry standard statistical descriptors have been developed to describe variable noise, as outlined in **Section 2** below.

NOISE DESCRIPTORS

L_{eq} – The sound pressure level averaged over the measurement period. It can be considered as the equivalent continuous steady-state sound pressure level, which would have the same total acoustic energy as the real fluctuating noise over the same time period.

L_{A90} - The A-weighted noise level that has been exceeded for 90% of the measurement duration.

dB – Decibels. The fundamental unit of sound, a Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell. Probably the most common usage of the Decibel in reference to sound loudness is dB sound pressure level (SPL), referenced to the nominal threshold of human hearing. For sound in air and other gases, dB(SPL) is relative to 20 micropascals (μPa) = 2×10^{-5} Pa, the quietest sound a human can hear.

A-WEIGHTING

"A-weighting" refers to a prescribed amplitude versus frequency curve used to "weight" noise measurements in order to represent the frequency response of the human ear. Simply, the human ear is less sensitive to noise at some frequencies and more sensitive to noise at other frequencies. The A-weighting is a method to present a measurement or calculation result with a number representing how humans subjectively hear different frequencies at different levels.

1 INTRODUCTION

1.1 SUMMARY

Acoustic Dynamics is engaged by **Aliro Group** on behalf of **ISPT Pty Ltd** to conduct an expert peer review of the noise impact assessment prepared and submitted by White Noise Acoustics for the proposed commercial development located at Clunies Ross Street, Greystanes, with the following document referenced:

- White Noise Acoustics report: 20009_190220_Noise Impact Assessment_BW_R5, dated 10 August 2020, titled *"Clunies Ross Street, SSD 10399-Prospect Logistics Estate Greystanes Noise Impact Assessment"*.

This peer review document provides a review of the relevant acoustic requirements for the design of the proposal and considers whether these have been adequately addressed in the White Noise Acoustics report.

Furthermore, this document provides a technical assessment, along with necessary planning advice to ensure potential noise impacts are suitably controlled to achieve compliance with the relevant acoustic criteria and requirements.

It has been prepared in accordance with the requirements of Blacktown City Council, NSW Environment Protection Authority (EPA), NSW Department of Planning, Industry and Environment (DPIE) and Australian Standards (AS).

This peer review document concludes that the proposed development (inclusive of 24 hour site operation, 7 days a week) can be designed to comply with the relevant acoustic requirements and criteria, subject to appropriate conditioning.

2 PEER REVIEW

1. Section 1 of the acoustic report summarises the location of the proposed development, the site layout, adjacent existing and future receiver locations and unattended noise logging locations. Acoustic Dynamics agrees that the receiver locations have been correctly identified.

2. Section 2 of the acoustic report lists the proposed spaces within the development site. Acoustic Dynamics understands the proposal is seeking consent for 24 hour site operation, 7 days a week.

3. Section 3.0 and 3.1 of the acoustic report details the methodology used to establish the existing acoustic environment at the site. The unattended noise logger locations and the short-term attended measurement location are deemed to be representative of the noise environment at the nearest receiver locations.

4. Section 4 of the report presents the AS 2107 recommended design sound levels for internal areas within the development. Although the recommended design sound level for packaging and delivery rooms has been correctly identified, it is noted that there are various types of occupancies within the warehouses. The internal sound level requirements for these areas should be determined and assessed following approval of the proposal application.

5. Acoustic Dynamics advise the various types of occupancies and corresponding recommended AS 2107 internal design sound levels include:

    a. offices ($L_{Aeq,t}$ 45 to 50 dB),
    b. lunch rooms ($L_{Aeq,t}$ 40 to 50 dB),
    c. reception areas ($L_{Aeq,t}$ 40 to 45 dB),
    d. meeting rooms ($L_{Aeq,t}$ 40 to 45 dB) and
    e. breakout spaces ($L_{Aeq,t}$ 40 to 45dB).

6. Section 5 of the report includes an assessment of environmental noise intrusion through the external facade to the various internal areas of use. Facade construction (including walls, glazing and roof) has been specified as minimum required based on the existing noise environment. The acoustic report includes a minimum design acoustic performance rating for the facade (i.e. required R_w 28).

7. Acoustic Dynamics advises the environmental noise intrusion assessment should consider the proposed use and likely future noise environment when specifying facade construction. In addition, low frequency noise intrusion (associated with heavy vehicle and mechanical plant operation) should be considered when specifying facade acoustic requirements.

8. Our calculations indicate the walls and glazing facade of the various warehouses should be constructed to achieve a minimum sound transmission performance ($R_w + C_{tr} \geq 30$). Warehouse roof construction should be designed to achieve $R_w + C_{tr} \geq 28$ dependent on the location and type of rooftop mechanical plant.

9. Section 6 and Section 6.1 of the report provides the methodology for determining project specific noise emission criteria, in accordance with the NSW EPA Noise Policy for Industry (NPfI). Acoustic Dynamics confirms the NPfI noise emission criteria have been appropriately applied for the assessment of on-site operational noise emission.

10. Section 6.2 of the report details the methodology for determining the sleep disturbance criterion. Acoustic Dynamics advises the criterion have been derived appropriately in accordance with the sleep disturbance assessment requirements of the EPA's Noise Policy for Industry and Road Noise Policy.

11. Section 7 of the report presents a (mechanical services and operations) noise impact assessment. The report provides satisfactory detail and assumptions regarding the various types of mechanical noise sources, equipment and noise generating activities that are likely to be installed to service the development, the location of mechanical plant and the operating capacity. The calculated noise emission results (inclusive of

mitigation treatments) are reasonable and are in general agreeance with our predicted cumulative noise emission results.

12. Acoustic Dynamics has conducted an assessment of noise emission associated with the proposal (inclusive of mechanical services and vehicle activity noise), at the nearest receiver locations, as presented in **Section 3** of this document. Within our noise model, all warehouses have been dimensioned as per the provided architectural plans, however we understand that the height of Warehouse 1 is to be reduced from 42 metres to 25 metres.

13. Sleep disturbance impacts have been assessed in Section 7.1.1 of the report. Although the report mentions a "car stacker" as the dominant instantaneous noise source, it is understood that no such equipment will be installed. Nevertheless, the sleep disturbance assessment and calculated results are reasonable and in general agreeance with our results.

14. The recommended acoustic mitigation in Section 7.2 of the report is acceptable for this stage of the development. Detailed acoustic mitigation advice can be provided following approval of the proposal.

15. Further to the above, Section 7.2 (point 6) recommends acoustic certification testing be undertaken following commencement of operations. Acoustic Dynamics advises that such a condition is appropriate and allows for the implementation of additional acoustic mitigation and management practices (if required).

16. Section 8 of the report correctly applies the relevant criteria for the assessment of road noise traffic impacts, as prescribed within Table 3 of the NSW Road Noise Policy (2011).

17. The Ason Group Traffic Impact Assessment (dated 3 June 2020) provides an indicative traffic count for vehicles accessing the site (within Table 10). It is noted that the vehicle movement scenario presented in the Traffic Impact Assessment estimates a slightly higher number of vehicle movements (per hour) during the peak morning and evening periods, than has been assumed within Section 8 of the acoustic report.

18. Acoustic Dynamics has conducted off-site road traffic noise calculations (inclusive of the Traffic Impact Assessment estimates) and can confirm that the predicted off-site road traffic noise levels included within Section 8 of the acoustic report are in agreeance with our predicted results.

19. Section 9 of the report provides an assessment of construction noise and a construction noise and vibration management plan. The assessment is conducted in accordance with the EPA Interim Construction Noise Guideline (ICNG). Construction noise and vibration control objectives have been determined in accordance with the ICNG, and NSW Department of Environment and Conservation "*Assessing Vibration: a technical guideline*".

20. Acoustic Dynamics advises the methodology for deriving construction noise control objectives (in Table 15 of the report), for noise affected RBL, is appropriately applied, however the construction noise management level should be $L_{Aeq} \leq 62$ dB (for northern residential receivers) and $L_{Aeq} \leq 58$ dB (for southern residential receivers).

21. The ICNG highly affected noise level objective and NSW DEC vibration guideline objectives have been applied appropriately. Assumed construction equipment and activity sound power levels are appropriate.

22. Acoustic Dynamics advise that we would typically include a proposed duration of works (i.e. approximate months for excavation and construction) to ensure neighbouring residents are aware of the anticipated works period and any potential amenity disruptions.

23. Acoustic Dynamics confirms that the predicted noise impacts in Section 9.5 of the report (i.e. exceedances of noise management levels) at neighbouring properties are in general agreeance with our calculations.

24. Acoustic Dynamics has conducted an assessment of construction noise impacts and advise that noise emission may occasionally exceed the construction noise management level at the residential properties to the east and south east. Noise emission associated with construction noise is predicted to comply with the Highly Noise Affected objective at all sensitive receiver locations.

25. Section 9.6 of the report presents an assessment of potential construction vibration impacts for the duration of works. Although no predicted vibration values are provided, the report does list alternate work practices to mitigate potential vibration impacts.

26. Acoustic Dynamics has conducted an assessment of construction vibration impacts and we advise that vibration levels are predicted to comply with the site specific emission objectives at all residential and commercial receiver locations.

27. Section 9.4 lists measures for the control of construction noise and vibration impacts during the period of works. The measures appear to be reasonable for the site however we would advise additional measures such as:

    - Noise and vibration induction of all site staff;
    - Implementation of community liaison procedure;
    - Use of temporary noise barriers;
    - Installation of noise and vibration monitors during high risk works periods;
    - Use of quietest available equipment for works;
    - An appropriate excavation methodology;
    - Preparation of a dilapidation survey of adjacent buildings and structures; and
    - Provision of respite periods during intensive activities.

28. Section 10 of the report provides the concluding summary and remarks. Our summary of the acoustic report and our acoustic opinion is provided in **Section 5** of this peer review document.

3 NOISE EMISSION ASSESSMENT

Further to the peer review presented in **Section 2**, Acoustic Dynamics has conducted an assessment of the predicted maximum noise emission associated with the use and operation of the development, at the adjacent receiver locations, against the various noise criteria and objectives detailed within the acoustic report. The assessment has been conducted based on the architectural drawings provided by the proponent (drawings dated 4 June 2020).

3.1.1 HOURS OF OPERATION

The operating hours of the various businesses within the site are unknown at this stage, however Acoustic Dynamics understands the proposal is seeking approval for 24 hour operation, 7 days a week.

It is likely that activity associated with the use of the site would be at 100% capacity during the day time, 75% during the evening and early morning and 50% during the night time.

To ensure impacts are adequately assessed, noise emission has been assessed based on the **maximum** capacity operation during the most sensitive assessment period (i.e. night-time) and additional modelling assumptions as presented in **Section 3.1.4**.

3.1.2 NEAREST RECEIVER LOCATIONS

Acoustic Dynamics advise that for the purpose of the acoustical assessment, the nearest sensitive receivers are:

- Residential receiver(s) located at 1 to 35 Muttong Street (to the east);
- Residential receiver(s) located at 31 and 33 Burraga Way (to the east);
- Future residential receiver(s) located at 47 and 49 Muttong Street (to the south east); and
- Adjacent commercial receiver(s).

Acoustic Dynamics advises that the above identified sensitive receivers have been assessed at the most affected point in the lot, being either at the boundary (taken at a height of 1.5 metres above the ground RL) and at the most affected point on the façade (taken at a height of 2.4 metres above ground RL for single storey dwellings and 5.4 metres above the ground RL for two storey dwellings).

We assume that the dwellings are of typical construction, being 3m height per floor level, with windows approximately 250mm below the ceiling height per floor level. Our facade receiver assessment-point is taken to be 250mm below the head of a window, which is considered to be a conservative approach in assessing noise impacts at sensitive receiver locations from the use and operation of the proposed development.

3.1.3 MODEL CONFIGURATION

Acoustic modelling was undertaken using computer modelling software (CadnaA™ 2021) to predict operational noise levels generated by the proposed development. CadnaA calculates environmental noise propagation according to the applicable international and ISO standards, including the ISO 9613 algorithm.

Ground absorption, reflection and relevant shielding objects (e.g. the acoustic barrier along Clunies Ross Street) are taken into account in the calculations, while topographical information was obtained and imported directly into the model.

Note. Acoustic Dynamics has modelled all Warehouses (dimensioned as per the provided architectural plans), however we understand that the height of Warehouse 1 is to be reduced from 42 metres to 25 metres.

The following assumptions were made with regard to the configuration of the noise model:

- A ground absorption coefficient of 0.5 is used throughout the model;
- All development site buildings and facade have been modelled as a 'smooth facade/reflective barrier', and the calculations have been configured to include 3 orders of reflections;
- All mechanical source sound power levels are taken from previous measurements or our library of manufacturer data; and
- All vehicles entering/leaving the site via Foundation Avenue or Clunies Ross Street are modelled as line sources travelling at 15 km/hr, with multiple lines to represent vehicles using parking spaces.

Further to the above general modelling assumptions, Acoustic Dynamics provide specific assumptions relating to the site, detailed as follows.

3.1.4 MODELLING ASSUMPTIONS

- Maximum 253 vehicles entering or leaving the site per hour (peak period);
- Maximum 80 HV movements per hour in the carpark areas (peak period);
- Trucks idling in each loading bay (SWL = 85 dB(A) per truck); and
- Mechanical plant assumed to be located on the rooftop or at ground level on external facade, i.e. air conditioning units, compressors, rooftop industrial exhaust fans and toilet exhaust fans.

3.1.5 MODELLING SCENARIO

Acoustic Dynamics has conducted modelling of a worst-case noise emission scenario as follows:

Noise Emission Scenario

- All mechanical noise sources operating simultaneously and continuously, over any 15-minute period; and
- 100% passenger vehicle and heavy vehicle movements.

NB: All listed noise sources and activities assumed to be operating simultaneously and continuously, over any 15-minute period during the assessment period.

It is highly unlikely that all equipment would be operating at their maximum sound power levels at any one time and certain types of equipment would be used on site for only brief periods during certain activities. Therefore, the noise modelling predictions are considered conservative.

3.1.6 SOURCE SOUND POWER LEVELS

Sound power levels associated with the use and operations of the proposed development are presented in **Table 3.1**. Typical equipment noise levels have been obtained from previous site measurements and our library of noise emission data.

Table 3.1 Equipment Details and Sound Power Levels

Source	Typical Noise Levels[1]
Air conditioning VRV Unit	SWL = 87 dB(A)
Rooftop Industrial Exhaust Fan	SWL = 95 dB(A)
Light Vehicles entering/exiting the site (15 km/hr)	SWL = 85 dB(A)
Heavy Vehicles entering/exiting the site (15 km/hr)	SWL = 95 dB(A)
Heavy Vehicle Idling	SWL = 85 dB(A)
Heavy Vehicle Reversing	SWL = 87 dB(A)

Note: 1) Third octave levels have not been displayed, however have been used in the CadnaA modelling.

3.2 OPERATIONAL NOISE ASSESSMENT PREDICTIONS

The calculated maximum external noise emission levels at the nearest receiver locations are presented in **Table 3.2** below, assessed against the criteria derived and presented with the acoustic report.

It is advised that by achieving compliance with the nearest receiver locations, compliance will also be achieved at those further away.

The predicted noise emission levels presented below in **Table 3.2** include allowances for relevant distance, direction and shielding losses. Acoustic Dynamics advises, although

unlikely to occur, the worst-case cumulative impact of all scenarios is presented within **Table 3.2**, demonstrating compliance with the noise impact criteria and objectives.

Table 3.2 External Predicted Noise Emission Levels & Relevant Criteria – Nearest Receivers

Residential Receiver Location	Assessment Period[1]	Activity / Noise Source[2]	Calculated Maximum L_{Aeq} Noise Level [dB]	EPA NPfI $L_{Aeq(15minute)}$ Noise Emission Objective [dB]	Complies?
Residential Receiver(s) at 1 to 35 Muttong Street	Night (10:00pm to 7:00am)	Maximum Use and Operation of Site	43	45 (Night)	**Yes**
Residential Receiver(s) at 31 and 33 Burraga Way	Night (10:00pm to 7:00am)	Maximum Use and Operation of Site	39	45 (Night)	**Yes**
Future Residential Receiver(s) at 47 and 49 Muttong Street	Night (10:00pm to 7:00am)	Maximum Use and Operation of Site	43	45 (Night)	**Yes**[3]
Adjacent Commercial Receiver(s).	Night (10:00pm to 7:00am)	Maximum Use and Operation of Site	55	65 (When in Use)	Yes

Note 1) Daytime being 7:00am to 6:00pm on weekdays and Saturdays and 8:00am to 6:00pm on Sundays and public holidays. Compliance with the more stringent night time criteria ensures compliance during all other periods.

2) The description of the activities and noise sources for the scenario is detailed in **Section 3.1.5**.

3) Includes the benefit of an assumed 2.8 metre high acoustic barrier located along the western property boundaries.

3.2.1 SLEEP DISTURBANCE ASSESSMENT

To assess any potential for sleep disturbance, maximum noise levels due to instantaneous noise events (such as car door slams) were calculated at the nearest sensitive receiver using CadnaA noise modelling software. The maximum impulsive sound power level was derived from British Standard BS5228:2009 *Code of Practice for noise and vibration control on construction and open sites – Part 1 Noise.* The L_{max} impulsive event noise level was modelled as a point source.

Modelling results indicate received noise levels resulting from transient noise events during the night-time assessment period 10:00pm to 7:00am, determined the potential maximum $L_{A1(60\ Sec)}$ noise emission to be **40 dB**. These events **achieve compliance** with the EPA's sleep disturbance screening criterion of $\mathbf{L_{A1(60sec)} \leq 52\ dB}$ during night-time hours.

4 RECOMMENDATIONS

The measurement and calculation results presented within **Table 3.2** above indicate that noise emission resulting from the use and operation of the proposed development, at all nearby sensitive receivers, can be conditioned to **comply** with the noise emission requirements of Council and the NSW EPA, provided suitable design recommendations are implemented.

Furthermore, noise emission associated with the use and operation of the development would generally be lower than the predicted results. The assessment has been conducted in a conservative manner to ensure that even during a **worst-case** noise emission scenario the acoustic amenity of neighbouring properties can be protected.

Acoustic Dynamics' calculations and analysis indicate that the predicted **maximum** noise emission associated with the proposed development will achieve compliance with the various relevant noise criteria, when the following controls are implemented.

4.1.1 MECHANICAL PLANT

Acoustic Dynamics advise that at this stage of the proposal, the selection and location of mechanical plant has not been finalised. Compliance with the relevant criteria can be achieved inclusive of the following mechanical plant controls:

1. Mechanical plant should be selected on the basis of low noise emissions. The cumulative mechanical plant noise emission level, when measured anywhere along the eastern and south eastern site boundary should not exceed the background noise level by more than 5 dB;

2. Control of mechanical plant noise can be achieved through appropriate installation location (i.e. locating plant away from sensitive receivers and utilizing buildings to provide shielding), construction of acoustic barriers and enclosures;

3. Installation of in-duct silencers and attenuators to control noise levels at end of duct;

4. Ensuring all exposed duct work is lined with a suitably dense acoustic material or wrap;

5. All items of mechanical plant should be isolated from the building structure through the use of resilient mounts, resilient sleeves and or spring hangers;

6. Where feasible, mechanical plant should be programmed to turn off or operate at reduced capacity during after-hours; and

7. Once a detailed mechanical schedule and layout has been determined, an acoustic consultant should be engaged to provide a review and recommendations to ensure mechanical noise emission is adequately controlled.

4.1.2 TENANCY NOISE EMISSION AND INTERNAL PRIVACY

At this stage of the proposal, specifics regarding the tenancy use and capacity are yet to be formalised. Noise emission associated with the various tenancies has been assessed in accordance with the conservative assumptions listed in **Section 3.1**. To ensure the use of the tenancies does not impact neighbouring tenancies and properties, it is advised the following recommendations are implemented.

1. Standard construction will be adequate for the fit-outs, however it is advised an acoustic consultant review the internal design and construction to ensure adequate isolation between adjacent tenancies within the warehouses and between warehouses and nearby residential properties, dependant on proposed usage;

2. An acoustic assessment would likely be required for potentially high noise emitting commercial uses such as a workshops, industrial kitchens, logistic supply, fitness studios and gyms, or any other use that would potentially cause amenity impacts for adjacent tenancies or nearby residents;

3. At this stage of the development, mechanical plant to service the various tenancies has not been determined, however once the plant has been selected, Acoustic Dynamics advises the operation of the plant can be appropriately conditioned to ensure compliance at all times with the requirements of Council and the EPA;

4. It is advised that a condition be written in to the tenancy lease agreements that includes the following:

   "The tenant shall provide airborne and structure-borne noise controls to ensure the acoustic amenity of adjacent tenancies and properties is adequately protected. Noise levels associated with the use of the tenancy must achieve compliance with the noise emission objectives of Council and the NSW EPA.".

5 PEER REVIEW CONCLUSION AND ACOUSTIC OPINION

Acoustic Dynamics has examined the acoustic report as well as the relevant standards and guidelines applicable to the assessment of noise impacts associated with the proposal. We provide the following summary and opinion:

Acoustic Opinion

Based on our review of the provided information, the acoustic report adequately addresses the acoustic concerns. Construction noise impacts, operational noise impacts and road traffic noise impacts are assessed at the nearest sensitive receiver locations and can be conditioned to comply with the relevant acoustic criteria.

It is our expert opinion that the proposal can be conditioned to achieve compliance with the relevant acoustic requirements and the amenity of neighbouring residents will be adequately protected.

We trust that the above information meets with your requirements and expectations. Please do not hesitate to contact us on 02 9908 1270 should you require more information.

Kind Regards

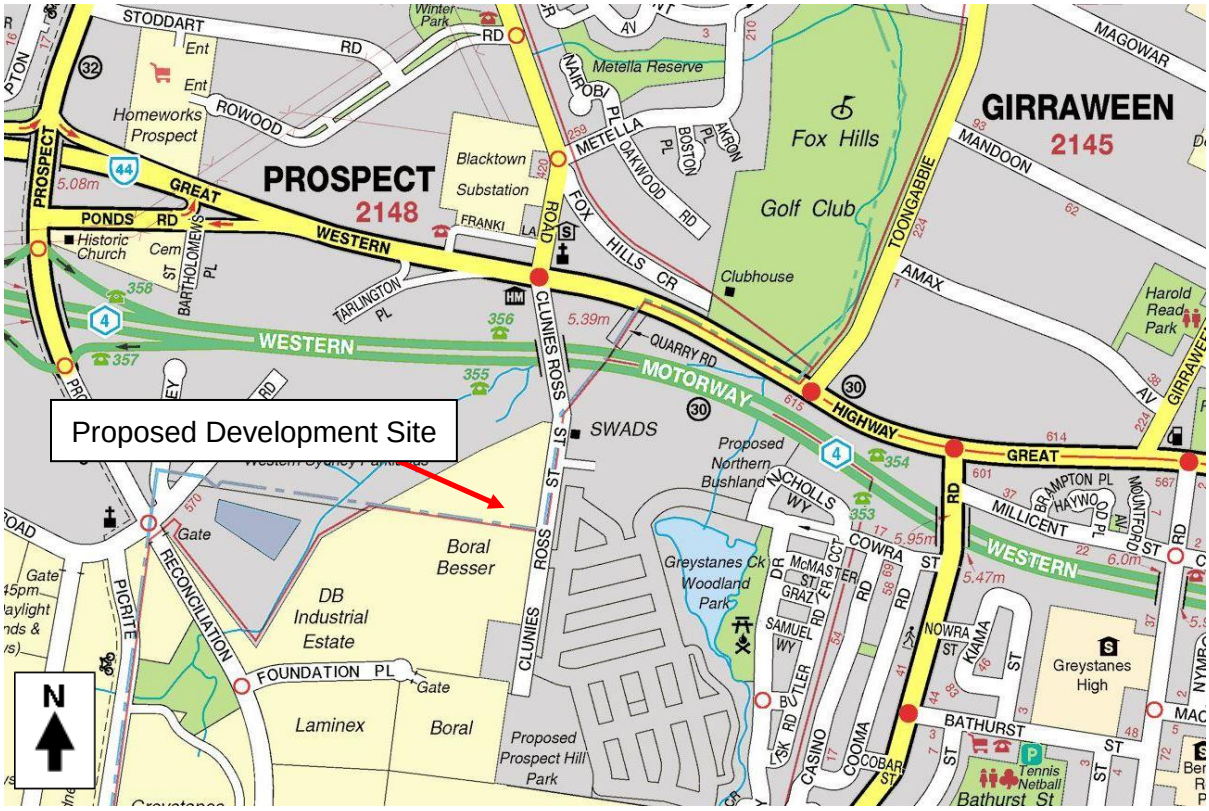
ACOUSTIC DYNAMICS

LUCAS BROOKER

Consultant, MDesSc (Audio & Acoustics)

APPENDIX A – LOCATION MAP, AERIAL IMAGE AND DRAWINGS

A.1 LOCATION MAP



A.2 AERIAL IMAGE (COURTESY OF SIXMAPS)

A.3 SITE PLAN (DRAWING NO. DA100, DATED 4 JUNE 2020)