The Acoustic Group
CONSULTING ACOUSTICAL AND VIBRATION ENGINEERS

ACOUSTICAL ASSESSMENT
THE HUB @ LIDCOMBE
2 BACHELL AVENUE, LIDCOMBE
53.5499.R1B:MSC

Prepared for: *Raad Property Acquisition No 10 Pty Ltd*
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APPENDICES

1.0 INTRODUCTION

The purpose of this report is to present the results and findings of an acoustic assessment for the proposed commercial development located at 2 Bachell Avenue, Lidcombe.

The project involves demolishing all the existing buildings at site for the construction of a development which will have a mixture of business and warehouse uses and operations permitted under the E3 Productivity Support classification in the Cumberland Local Environmental Plan.

Under the Council requirements an acoustic assessment has been undertaken to provide noise targets that will apply to the entire development.

As a result of proximity to an active railway line, in addition to noise there are requirements to assess vibration impacts for the development of the site.

To determine the acoustic design targets for the proposed development unattended noise monitoring was conducted at the site between Thursday 16 June and Sunday 26 June 2022.

Attended vibration measurements were conducted on 27 June 2022 and continued over night as unattended vibration logging.

2.0 THE SITE

The site was previously in the area administered by Auburn Council, but now is in the Cumberland Local Government Area.

The Cumberland LEP 2021 and the Cumberland DCP 2021 apply to the site.

Appendix A provides an extract of the Cumberland LEP Land Zoning Map that identifies the subject site (a triangular lot) is zoned E3 Productivity Support and abuts Railway Infrastructure zoning on a south-east boundary, and general industrial zoning on the north-eastern boundary.

The land zoning map identifies that the majority of the north western boundary abuts low density residential (R2 zoning), whilst the southern portion of the north-western boundary (south of Rawson Street) abuts medium density residential (R3 zoning).

The subject site abuts Bachell Avenue to the west which is a road that services the industrial area of Lidcombe (to the north of the site) and provides a connection for traffic through to the Lidcombe's CBD area.

On the western side of Bachell Avenue are residential premises.

North east of the site are industrial estates with the majority of the buildings having multiple warehouse complexes.

The south-eastern boundary of the site abuts the T7 rail line ("Olympic Park line") that provides a connection from Lidcombe to Sydney Olympic Park for passenger trains. Adjacent to the south eastern boundary and the T7 line is an earth mound that provides visual and acoustic shielding to rail traffic on that line.

Further to the south-east of the site is the Flemington Maintenance Centre operated by state rail that has a vehicle access off Bachell Avenue (south of the site).

The objectives of E3 Productivity Support (from the Cumberland LEP) are:

- *To provide a range of facilities and services, light industries, warehouses and offices.*
- *To provide for land uses that are compatible with, but do not compete with, land uses in surrounding local and commercial centres.*
- *To maintain the economic viability of local and commercial centres by limiting certain retail and commercial activity.*
- *To provide for land uses that meet the needs of the community, business and industries but that are not suited to locations in other employment zones.*
- *To enable other land uses that provide facilities and services to meet the day to day needs of workers, to sell goods of a large size, weight or quantity or to sell goods manufactures on-site.*

The LEP identifies an E3 Productivity Support zone is permitted with consent to have:

> *Animal boarding or training establishments; Boat building and repair facilities; Building identification signs; Business identification signs; Business premises; Centre-based childcare facilities; Community facilities; Depots; Food and drink premises; Function Centres; Garden centres; Hardware and building supplies; Hotel of motel accommodation; Industrial retail outlets; Industrial training facilities; Information and education facilities; Kiosks; Landscaping material supplies; Light industries; Local distribution premises; Markets; Mortuaries; Neighbourhood shops; Office premises; Oyster aquaculture; Passenger transport facilities; Places of public worship; Plant nurseries; Recreation areas; recreation facilities (indoor); Research Stations; Respite day care centres; Rural supplies; Service stations; Specialised retail premises; Storage premises; Take away food and drink premises; Tank-based aquaculture; Timber yards; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Veterinary hospitals; Warehouse or distribution centres; Wholesale supplies; Any other development not specified in item 2 or 4.*

The architectural drawings of The Hub @ Lidcombe development prepared by Two Form Architecture + Interior Design (Job No. 18107.3, revision A, dated 16 May 2023) identify that the project involves:

- demolishing the existing buildings at the site for the construction of 3 underground parking levels and 4 buildings.
- Building A has 9 levels, being ground floor to level 8. Building B has 8 levels being ground floor to level 7, Building C (adjacent Bachell Avenue) has 5 levels being ground floor to level 4, and Building D has 7 levels being ground floor to level 6.
- The legend to the drawings identify the usage classifications of:
    - Specialised Retail premises
    - Health & Community
    - Office
    - Recreation Facility (indoor) gym
    - Food and Drink Industries
    - Workspaces
    - High Technology Industry\Storage
    - Centre Based Child Care Facility
    - Small dog boarding facility of the roof of Building B
- Drawing DA108 identifies the Childcare Centre on level 5 of Building A and is proposed to have outdoor play areas at the Bachell Avenue end and T7 rail line end of the building.

3.0 ACOUSTIC CRITERIA

The various occupancies of the development in acoustic terms are subject to different acoustic criteria for both the emission of noise from activities occurring in the occupancies and noise intrusion into the different occupancies.

This Acoustic Assessment utilises the results of attended noise monitoring to describe the existing acoustic environment of the site and presents noise design targets for the various components of the proposed development.

Under the existing situation the site incorporates industrial use in a high traffic area.

Under EPA requirements the site is considered to be an industrial premises and has noise emission targets for the residential receivers that are different to noise targets for the adjacent industrial land.

3.1 Council DCP

Under the previous LEP the land was zoned B5 Business Development Zone, but has been changed in the current LEP to E3 Productivity Support. The DCP has not been updated to reflect the new E3 zoning.

For the purpose of this assessment reference is made to Part C of the Cumberland DCP 2021 that is identified as “Development in Business Zones”.

Section 1.1 of Part C of the DPC identifies Part C applies to B5 Business Development zones.

Section 3.11 of part C of the DCP is identified as “Visual and acoustic privacy”. Section 3.11 lists the following Development controls for acoustic privacy:

C3. Conflicts between noise, outlook and views are to be resolved by using design measures, such as double glazing, operable screened balconies and continuous walls to ground level courtyards, where they do not conflict with streetscape or other amenity requirements.

C4. Where commercial/office uses and residential uses are located adjacent to each other, air conditioning units, buildings entries and the design and layout of areas serving after hours uses shall be located and designed to minimise any acoustic conflicts.

C5. Developments shall be designed to minimise the impact of noise associated with uses whose hours may extend outside of normal business hours, including restaurants and cafes. Operation includes loading/unloading of goods/materials, and the use of plant and equipment at a proposed commercial premise.

C6. Mixed use developments shall be designed to locate driveways, carports or garages away from bedrooms.

C7. Mechanical plant must be visually and acoustically isolated from residential uses.

C8. New development shall comply with the provisions of the relevant acts, regulations, environmental planning instruments, Australian Standards and guidelines as applicable for noise, vibration and quality assurance. This includes:

- *Development Near Rail Corridors and Busy Roads, NSW Department of Planning, December 2008 – Interim Guidelines;*
- *NSW Noise Policy for Industry;*
- *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects; and*
- *NSW Road Noise Policy.*

Interface with schools, places of public worship, and public precincts

C9. Where a site adjoins a school, place of public worship or public open space, the building design will:

- *incorporate an appropriate transition in scale and character along the site boundary(s); and*
- *present an appropriately detailed facade and landscaping in the context of the adjoining land use.*

This interface shall be identified in the site analysis plan and reflected in building design.

C10. The potential for overlooking of playing areas of schools shall be minimised by siting, orientation or screening.

C11. Fencing along boundaries shared with public open space shall have a minimum transparency of 50%.

C12. Sight lines from adjacent development to public open space shall be maintained and/or enhanced. Direct, secure private access to public open space is encouraged.

Section 3.19 in Part C of the DCP relates to Food and drink premises. Control C1 requires an acoustic report.

Part E of the Cumberland DCP is related to “Other land use based development controls”. Part E1 relates to Centre Based Childcare Facilities. Part E1 does not specify any quantitative noise criteria for Childcare Centres.

3.2 Transport and Infrastructure State Environmental Planning Policy

The *State Environmental Planning Policy (Infrastructure) 2007* (“*Infrastructure SEPP*”) and the NSW Department of Planning’s *Development Near Rail Corridors and Busy Roads – Interim Guideline* (“*Interim Guideline*”) applied to developments within or adjacent to a major road corridor with an annual average daily traffic volume of more than 40,000 vehicles or adjacent a rail corridor,

In the Infrastructure SEPP, Clause 87 for rail corridors and Clause 102 for road corridors specified noise criteria to apply to the internal areas of residential use, an educational establishment or child care centre.

In March 2022 the *State Environmental Planning Policy (Transport and Infrastructure) 2021* was issued.

In Division 15 “Railways and rail infrastructure facilities”, Subdivision 2 “Development in or adjacent to rail corridors and interims rail corridors”, Clause 2.100 “Impact of rail noise or vibration on non-rail development” provides criteria that replaces clause 87 of the Infrastructure SEPP.

In Division 17 “Roads and traffic”, Subdivision 2 “Development in or adjacent to road corridors and road reservations”, Clause 2.119 “Impact of road noise or vibration on non-road development” provides criteria that replaces clause 102 of the Infrastructure SEPP.

Clause 2.120 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* applies to specified developments (a building for residential use, a place of public worship, a hospital, and educational establishment or child care centre) adjacent to a road corridor or any other toad with an annual average daily traffic volume of more than 20,000 vehicles that the consent authority considers is likely to be adversely affected by road noise or vibration.

Clause 2.120 of the *Transport and Infrastructure SEPP* does not specify any noise criteria to apply to child care centres.

Transport for NSW provides Traffic volume maps for Infrastructure SEPP (https://roads-waterways.transport.nsw.gov.au/about/environment/reducing-noise/traffic-volume-maps-for-infrastructure-sepp.html). Bachell Avenue is not classified as a road corridor carrying above 20,000 vehicles a day. Therefore, the Transport and Infrastructure SEPP road noise criteria does not apply to the site.

The subject site is adjacent to Bachell Avenue which is a sub-arterial road corridor by definition in the EPA's *Road Noise Policy.*

The eastern side of the site is adjacent a rail corridor.

The NSW Department of Planning's *Development Near Rail Corridors and Busy Roads – Interim Guideline* ("*Interim Guideline*") provides guidance on the use/interpretation of clause 87 (for rail traffic) and clause 102 (for road traffic) of the *Infrastructure SEPP* and could be used for the assessment of Clause 2.119 of the *Transport and Infrastructure SEPP*.

Section 3.6.1 of the *Interim Guideline* identifies that the *Infrastructure SEPP* noise targets are to be assessed as an Leq level over 9 hours for the night-time period and an Leq level of 15 hours for the daytime period with reference to the EPA's *Environmental Criteria for Road Traffic Noise*. ("ECRTN"). The ECRTN has been replaced by the *NSW Road Noise Policy* ("RNP").

The RNP recommends noise criteria to apply to Child Care Centres.

Section 3.2 of the *Interim Guideline* provides reference sources where for assessing vibration the source is *Assessing Vibration: a technical guideline (DECC 2007)*. That document is still in use by the EPA.

3.3 EPA Road Noise Policy

The primary function of the EPA's *NSW Road Noise* Policy ("RNP") is to address road traffic noise impact on residential receivers. The policy identifies different classifications of road types that in turn lead to different noise targets.

- existing residences subject to new freeway/arterial/sub-arterial road corridors
- redevelopment of existing freeway/arterial/sub-arterial roads, and
- existing residences affected by additional traffic on freeway/arterial/sub-arterial roads generated by land use developments.

Table 2 in the RNP identifies roads in terms of a functional role. As Bachell Avenue provides a connection between arterial roads and local roads under the RNP the sub-arterial road category applies.

Table 3 in Section 2.3.1 of the RNP identifies for existing residences affected by additional traffic on existing sub-arterial roads generated by land use developments is assessed against a daytime $L_{Aeq,\ (15\ hour)}$ 60 external to the dwelling and a nighttime $L_{Aeq,\ (9\ hour)}$ 55 external to the dwelling.

Under Section 3.4.1 of the RNP:

> *For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*

Section 2.3.2 of the RNP provided noise assessment criteria for non-residential land uses. Table 4 identifies for mixed use development each component of use in a mixed use development should be considered separately, with child care facilities an example of a separate use

Table 4 of the EPA's *NSW Road Noise Policy* ("RNP") provides the following noise criteria for childcare facilities:

- The maximum internal noise level within sleeping and indoor play areas of the centre to be 35 dB(A) and 40 dB(A) respectively during operation when assessed as an $L_{eq,\ 1\ hour}$.
- The maximum noise level in the outdoor play areas of the centre to be 55 dB(A) during operation when assessed as an $L_{eq,\ 1\ hour}$.

The EPA provide in Table 4 of the RNP criteria for road traffic noise intrusion for school classrooms and hospital wards. For other rooms in an education/healthcare building that are not a classroom or hospital ward the RNP refers to the maximum recommended design sound levels in Australian Standard AS 2107:2000.

Australian Standard AS 2107 recommends design sound levels for various types of occupancies in buildings but was revised in October 2016 to exclude road traffic noise in different occupancies.

Whilst not directly applicable to the proposed development (under the DCP), the recommended design sound levels in Table 1 of Australian Standard AS 2107:2016 can been utilised to determine suitable internal road traffic noise targets for the commercial components of the proposed mixed-use development.

3.4 Noise Policy for Industry

Whereas the *Transport and Infrastructure SEPP* and the RNP are related to traffic noise impacting upon the proposed child care centre, the EPA's *Noise Policy for Industry* (**NPfI**) governs noise emitted from premises.

For the assessment of noise emitted from the proposed development the NPfI is the primary document setting out the acoustic requirements, as Section 1.4 of the NPfI identifies the types of premises dealt with in the policy include commercial premises (generally limited to noise from heating ventilation air condition and refrigeration) and can be used for vehicle movements within the premises.

Under the NPfI, the critical noise emission issues with respect to the shops/retail tenancies, food and drink tenancies, offices and car parks relate to the noise emission from mechanical plant and the on-site component of road traffic associated with the operation of those premises.

Internal activities in the retail component are expected to give rise to noise emission levels significantly below the ambient background level at the nearest receivers because of attenuation through the building envelope.

Whilst Section 1.4 of the NPfI identifies noise sources that are appliable to the policy, Section 1.5 lists the noise sources that are excluded from the policy, citing the policy is not applicable to "amplified music/patron noise from premises including those licensed by Liquor & Gaming NSW". Accordingly, after excluding mechanical plant noise, noise associated with the use of the child care centre, and the restaurants/food outlets (being music or patron noise) are not covered by the NPfI.

As an overall design concept, the project noise trigger level established in the NPfI have two components. The first component is the intrusiveness noise level which addresses the increase in noise level above the ambient background level from industrial sources. The second component is the amenity noise level which addresses the absolute level of industrial sources. The project trigger noise level is the lower (i.e., more stringent) value of the intrusiveness noise level and the project amenity noise level.

The intrusiveness noise level is only applied to residential receivers and utilises a concept of the industrial source having a noise emission level that does not exceed 5 dB(A) above the ambient background level when assessed as a $L_{Aeq,15min}$ level at the residential boundary and/or the most affected point on the residential premises.

The recommended amenity noise levels for various types of receivers are set out in Table 2.2 of the NPfI. Tables 2.2 & 2.3 in the NPfI refer to zoning classifications that existed in 2017. Zoning E3 in Table 2.3 refers to Environmental Management.

For the derivation of the amenity noise targets this assessment uses the previous B5 zoning. The recommended amenity noise level in the NPfI relates to the noise emission from all industrial sources (as a cumulative level) over the entire day, evening, and night-time periods. As the recommended amenity noise levels represent the objective for the total industrial noise, the NPfI specifies the project amenity noise level for a single industrial development to be 5 dB(A) less than the recommended amenity noise level.

The classification of receiver locations in Table 2.2 of the NPfI identifies that for residential receivers the receiver category is based upon the planning zoning of the receivers. Table 2.3 of the NPfI identifies B1, B2 and B4 zones can be considered as urban residential. Under Table 2.2 the B5 Business Development zoning leads to an amenity target based upon commercial use that has a noise target of 65 dB(A), whilst for industrial premises a noise target of 70 dB(A).

Section 2.4.1 of the NPfI identifies for areas with high traffic noise, there is a potential for an industrial noise source to be inaudible but exceed the project amenity noise level. Therefore, for scenarios where the existing traffic noise level is 10 dB or more above the recommended amenity noise level for the area, then the project amenity noise level for the industrial development becomes the $L_{Aeq,\ period}$ noise level of the traffic minus 15 dB(A).

Section 2.4.2 of the NPfI considers a new industrial estate to constitute a single premises with respect to the amenity noise target. Where there is a redevelopment of an existing cluster of industry consisting multiple new noise-generating premises the approach is to allocate individual project amenity noise levels for each noise-generating premises considering the cumulative impact of all the noise generating premises with respect to the amenity noise level determined from the amenity noise level in Table 2.2 of the NPfI.

From the Plan of Management the Self-Storage and Gym can operate 24 hours a day, whilst the Food & Drink Premises can operate between 8am and midnight.

For commercial premises that operate during the night-time period of 10:00 pm to 7:00 am, Section 2.5 of the NPfI requires the maximum noise level events from the use of the premises during this period including the noise of staff/patron's vehicles on-site are required to be assessed at residential locations with respect to the following noise criteria to address potential sleep disturbance impacts.

- L_{AFmax} 52 dB(A) or the prevailing RBL +15 dB(A), whichever is the greater; and
- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL + 5 dB(A), whichever is the greater.

3.5 Vibration Impacts

The NSW Department of Planning's *Development Near Rail Corridors and Busy Roads – Interim Guideline* ("*Interim Guideline*"), cited in control C8 of section 3.11 in part C of the DCP, refers to a document published by the Department of Environment and Conservation in 2006 titled *Assessing Vibration: a technical guideline*.

The guideline provides vibration criteria based upon British Standard BS 6472-1992 *Evaluation of human exposure to vibration in buildings* (1-80Hz).

The DEC guideline presents preferred and maximum values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques.

The DEC guideline presents criteria for continuous and impulsive vibration at receiver locations in terms of three orthogonal axes – the x axis, the y axis, and the z axis relative the position of an individual.

For intermittent sources (such a rail movements) the DEC guideline presents the concept of a 'vibration dose'.

The level of vibration is measured in each axis using the rms vibration acceleration in m/s^2.

With respect to the perception of vibration the three axes are referenced to the human body with the x-axis identified as back to chest, the y-axis as right side to left side, and the x axis as foot to head.

For persons in a lateral position (e.g. asleep) the z axis is assumed to be a horizontal axis whereas in the day time the z axis is assumed to be a vertical axis.

The relationship of the individual is important because the respect to the relevant axis of vibration there are different frequency responses as shown below (from Appendix B of the DEC guideline).

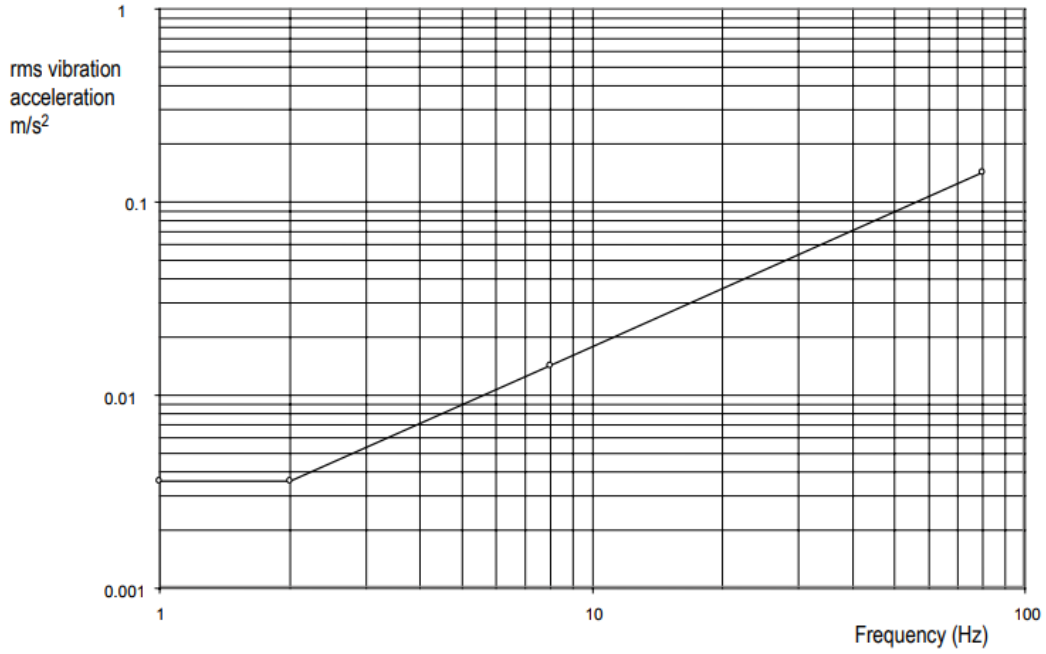


Figure B1.2 Weighted x- and y-axis vibration rms acceleration (Source: BS 6472–1992)

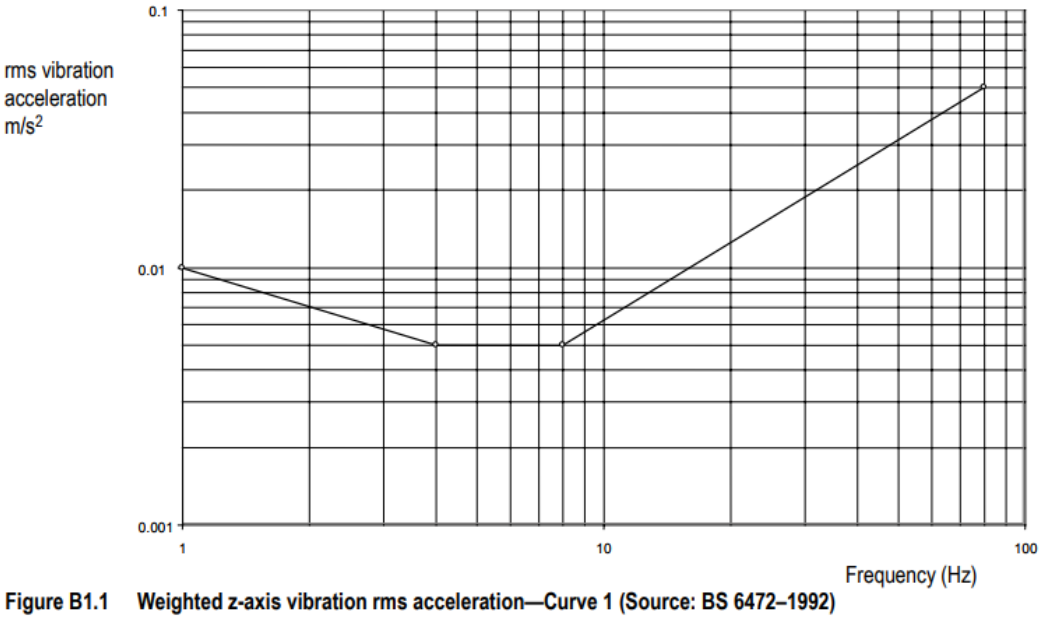


Figure B1.1 Weighted z-axis vibration rms acceleration—Curve 1 (Source: BS 6472–1992)

The DEC guideline provides criteria for continuous and impulsive vibration which are not applicable to the site as there is no continuous or impulsive vibration present at the site.

It is under the *Transport and Infrastructure SEPP* and in turn the NSW Department of Planning's *Development Near Rail Corridors and Busy Roads – Interim Guideline* ("*Interim Guideline*") that the child care component of the development is assessed in terms of the DEC guideline for intermittent vibration.

From the DEC guideline, the basis vibration parameter for each of the individual axis is to obtain the linear vibration results for each 1/3 octave band (1Hz – 8 Hz), apply the weighting values for the above curves to obtain the weighted rms acceleration m/s^2.

One then squares the weighted rms acceleration m/s^2 value for each 1/3 octave band, sums the squares and takes the square root of the sum to obtain the weighted rms acceleration.

Where vibration comprises repeated events, each of a similar value and durations, a vibration dose value ("VDV") is calculated from the z-axis overfall weighted rms acceleration using the root-mean-quad approach to obtain a VDV in metres per second to the power 1.75 ($m/s^{1.75}$) and assessed with respect to Table 2.4 in the DEC guideline.

Table 2.4 Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

1 Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.
2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.
Source: BS 6472–1992

The DEC guideline also permits the measurements to be undertaken for screening purposes using the velocity parameter (as other building vibration assessments use peak velocity) as a conservative basis as the peak velocity weighting curve is flat from 8Hz.

Appendix B2.2 in the DEC guideline provides conversions between peak velocity and rms acceleration results to obtain the estimated VDV for screening purposes.

3.6 Liquor & Gaming NSW Noise Emission Criteria for Licensed Premises

The plans identify the provision of food and beverage uses in the development.

There is potential for some of those uses to include the consumption of alcohol.

In relation to noise emission from licensed premises, Liquor & Gaming NSW ("L&G NSW") have identified on their website, under Liquor & Gaming NSW decisions reports on disturbance complaints, the use of the "LA10 Noise Condition".

In L&G NSW assessments there is a requirement to break up the analysis into frequency components called octave bands with centre frequencies from 31.5 Hz to 8 kHz. Musically speaking, low frequency is typical of the bass guitar and bass drum whilst high frequency is like a cymbal or a triangle. The octave bands measured encompass most of the audible spectrum and the LA10 Noise Condition analysis requires the music to be assessed in individual octave bands.

The LA10 Noise Condition are in two parts according to different times of the day, being the pre-midnight criteria (7.00 am to midnight) and the post-midnight criteria (after midnight to 7.00 am). The pre-midnight criterion allows noise emitted from a licensed premise to exceed the background noise level by 5 dB in any octave band with centre frequencies between 31.5 Hz and 8 kHz at any residential boundary.

As the background level is defined as the level that is exceeded for 90% of the time and therefore is measured on a statistical basis, the impact of the acoustic environment of the area on a statistical L10 level requires one to determine the noise level attributed to the licensed premises.

To identify the difference between the existing ambient L10 and the noise to be assessed from a licensed premise, the before midnight residential boundary noise criterion is described as:

> *The LA10* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz – 8k Hz inclusive) by more than 5 dB between 07:00 am and 12:00 midnight at the boundary of any affected residence.*
>
> *For the purpose of this condition the LA10* can be taken as the average maximum deflection of the noise emission from the licensed premises.*

The post–midnight noise criteria are more stringent and require that the noise emission from any licenced premises is not to exceed the background noise level within the same octave bands used in the pre–midnight criteria at any residential boundary. The post-midnight criteria also stipulate that noise emissions from licenced premises are to be inaudible in any habitable room of any residential premises.

There is often a misconception/misinformation in terms of the permitted LA10 numerical criteria and inaudibility. Compliance **with the before midnight criterion permits noise from the licensed premises to be audible at residential boundaries and permits measurable increases above the background level.** This means noise from licensed premises is permitted to be audible inside the dwellings before midnight.

For the after-midnight period noise from licensed premises can be audible at the residential boundary and comply with the boundary noise limits. The inaudibility criterion **ONLY** applies inside the residential premises after midnight. From acoustic standards/policy documents in Australia the normal practice is to apply the inaudibility criterion to habitable rooms, not bathrooms, dressing rooms or garages.

As access is not normally available to premises for the period after midnight, determination of the inaudibility criterion is based upon a derived contribution of between 7 to 10 dB below the background level, measured externally to a residential premise. This contribution indicates a negligible increase above the background level (in individual octave bands) and should result in compliance with the inaudibility criterion inside the dwelling.

3.7 AAAC Guideline for Childcare Centre Acoustic Assessment

With respect to noise criteria applicable to child care centres there is no specific EPA policy in NSW.

The Cumberland DCP does not provide any acoustic criteria in relation to child care centres.

Normally the Council in acoustic matters rely upon criteria issued by the EPA and in particular the EPA's *Noise Policy for Industry* ("NPfI") or the *Noise Guide for Local Government* ("NGLG"). Neither of the two EPA documents specify noise emission limits for Childcare Centres, and in particular noise emitted from outdoor play areas.

With respect to noise emitted from a child care centre, the NPfI does not provide specific noise emission criteria for outdoor or indoor play for Childcare Centre developments.

Section 1.4 of the NPfI identifies the noise sources that are appliable to the policy which includes “commercial premises (generally limited to noise from heating, ventilation, air conditioning and refrigeration, and energy generation equipment)”.

Section 1.5 of the NPfI provides a list of noise sources that are excluded from the policy. The list identifies that the policy does not apply to “amplified music/patron noise from premises including those licensed by Liquor & Gaming NSW”. For the subject child care centre from a noise perspective the children are the patrons.

The EPA require noise from industry or traffic (external to the site) to be under specified noise limits for outdoor play areas and internal areas of a child care centre, and under the general EPA concepts noise limits that apply to noise from mechanical plant on the site. This situation is similar to the same noise concepts for schools.

In January 2023 the NSW EPA released an upgrade to their 2013 *Noise Guide for Local Government*. Whilst not setting criteria, Table 6 sets out responsibilities and regulatory options for managing noise in NSW – Educational facilities. In relation to private childcare centres two examples are provided:

- Fairfield City Council, Fairfield City Wide Development Control Plan, chapter 13 Child Care Centres (2013)
- Association of Australasian Acoustical Consultants (AAAC), Guideline for Child Care Centre Acoustic Assessment (2013).

It is noted that Fairfield Council in more recent child care centre applications (from 2021) have accepted the AAAC guideline.

The AAAC Guideline referenced in Table 6 of the 2023 NGLG is version 2. As the AAAC Guideline was revised in September 2020 it is suggested that the NGLG should have referenced the 2020 version, to be consistent with sub section 7.7.4 of the NGLG (2023).

Section 7.7 of the NGLG (2023) refers to the assessment of impact. Sub section 7.7.4 states:

> *7.7.4 Childcare centres and play spaces*
>
> *Childcare centres are an increasingly common noise source in residential areas. The Association of Australasian Acoustical Consultants (AAAC) has published a Guideline for Child Care Centre Acoustic Assessment (AAAC, 2020) for assessing and managing noise from childcare centres, which councils may choose to adopt under relevant circumstances.*

If the Council relies on updated EPA policies, then from the NGLG (2023) as the EPA have referred to the AAAC Guideline, one must apply the V3 Guideline.

For various Childcare Centres/Pre-Schools/Kindergartens/Long Day Care Centres that have come before the Land & Environment Court of New South Wales, there has been no adjustment for tonality associated with children playing, although there have been adjustments in terms of the general background +5 dB(A) criterion in relation to the total duration of the outdoor play.

Version 3 of the AAAC Guideline permits the use of a background +10 dB noise criterion for outdoor play areas, where outdoor play occurs for up to 4 hours per day (limited to no more than 2 hours in the morning and 2 hours in the afternoon). Where outdoor play exceeds 4 hours in total per day (i.e., more than 2 hours in the morning and 2 hours in the afternoon), then the noise limit reduces to background +5 dB(A).

In many situations in residential areas, barriers may be erected to reduce noise emission from the site (or noise intrusion to the site), in addition to the provision of a management plan to identify the use of the outdoor areas.

For commercial receivers the AAAC Guideline nominated a noise target of 65 dB(A) for all activities (including outdoor play). This agrees with the NPfI amenity target.

Under the AAAC guideline the Child Care Centre is considered as a separate noise source – independent of the overall development.

From the RNP and the AAAC Guideline (version 3), the following noise targets have been nominated for the proposed development:

- Internal noise levels (from road traffic) 40 dB(A), $L_{Aeq,\ 1\ hour}$
- Internal noise levels of cot rooms (from road traffic) 35 dB(A), $L_{Aeq,\ 1\ hour}$
- External play areas (from road traffic) 55 dB(A), $L_{Aeq,\ 1\ hour}$
- When the total outdoor play occurs for more than 2 hours per day in either the morning or afternoon (i.e., no time restriction to the operation of the outdoor play areas), noise emission from the outdoor play area is not to exceed background +5 dB(A), $L_{Aeq,\ 15\ minutes}$ or 45 dB(A) $L_{Aeq,\ 15\ minutes}$ at residential receivers, whichever is greater
- When the total outdoor play occurs for not more than 2 hours in the morning and not more than 2 hours in the afternoon per day, noise emission from the outdoor play area is not to exceed background +10 dB(A) at residential receivers, $L_{Aeq,\ 15\ minutes}$ or 50 dB(A) $L_{Aeq,\ 15\ minutes}$, whichever is greater
- Noise emission from traffic generated by the Childcare Centre with respect to Bachell Avenue is to satisfy 55 dB(A), $L_{Aeq,\ 1\ hour}$ or existing $L_{Aeq,\ 1\ hour}$ +2 dB where the existing $L_{Aeq,\ 1\ hour}$ exceeds 55 dB(A)
- The cumulative noise of indoor activities, vehicle movements on site and mechanical plant is not to exceed background +5 dB(A) at residential receivers

4.0 AMBIENT MEASUREMENTS

From the preceding section the relevant acoustic criteria for the different components of the proposed mixed use development reference ambient background and/or ambient Leq levels.

The fundamental purpose of the acoustic assessment is to derive the criteria applicable to the development thereby requiring the conduct of ambient noise measurements.

Ambient noise measurements were taken in accordance with the Australian Standard AS1055 *"Acoustics - Description and Measurement of Environmental Noise"* and the ambient background measurement procedures set out in Fact Sheet B of the EPA's *Noise Policy for Industry*.

Unattended sound level measurements were recorded using SVAN 977A Sound Level Meter (serial no. 92182) and a SVAN 979 Sound Level Meter (serial no. 35808). The meters were calibrated to manufacturer's requirements at the time of the measurements.

The attended sound level measurements were recorded using a Bruel & Kjaer 2270 Sound Level Meter (serial no. 3029844). The meter was calibrated to manufacturer's requirements at the time of the measurements.

The reference calibration level of each sound level meter was checked prior to and after measurements using a Bruel & Kjaer Sound Level Calibrator Type 4321 and exhibited no system drift.

Attended and unattended vibration measurements were recorded using a Vibrock V901 portable vibration monitor.

5.0 AMBIENT MEASUREMENT RESULTS

As the site is adjacent to Bachell Avenue the acoustic environment on the western side of the site is controlled by traffic and to a lesser extent industrial noise from the immediate surrounding area.

For the eastern side of the site the ambient noise is influenced by general industrial noise from the north and east (see Appendix A) and to a lesser extent by traffic on Bachell Avenue.

As the proposed development will have occupancies in the buildings up to 9 floors the influence of the railway infrastructure and general industrial noise will be greater than at ground level.

As there are a range of ambient noise levels across the site, determination of the ambient noise levels involved two unattended noise monitoring locations.

The northern logger was located in the northern section of the site on the existing building alignment to Bachell Avenue with a microphone height of 1.5 metres above ground level.

Because of the proximity of warehouse buildings to the north east, that acoustically shields the general industrial area, the dominate noise source at the northern logger was from traffic on Bachell Avenue.

Because of the embankment between the south eastern boundary of the site and the T7 railway line the southern noise logger utilised an elevated pole to position the microphone at 10m above ground level that resulted in an uninterrupted exposure to noise from the general industrial area and the rail infrastructure to the north and east respectively.

Appendix C3 presents an aerial view of the site and surrounding area with an illustration of the attended and unattended noise monitoring locations. Appendix C4 identifies the extension pole for the microphone at the southern logger position to place the microphone above the embankment.

The logger results set out in Appendix D relate to the unattended ambient noise levels recorded on a continuous basis between 16 and 26 June 2022. The results of the logger measurements are presented in the form of both a table of results and a set of charts showing the variation of the noise level throughout the day and night.

Examination of the weather data from the Bureau of Meteorology weather station at Sydney Olympic Park indicated that there were periods of adverse weather (predominately strong winds and for a limited period rain) during the logging period. In accordance with EPA procedures, the noise logger data for the periods which were affected by adverse weather have been excluded in the determination of the RBL.

In general, the logger graphs for the northern logger show ambient levels during the daytime and evening periods that are significantly higher than the night-time ambient levels which is typical of sites near busy roads. The northern logger shows periods of elevated background levels in the day that during site inspections were observed to be from loading activities occurring in the open area of the adjacent industrial premises.

The southern logger graphs (that utilised an elevated microphone) show higher ambient noise levels (than for the northern logger) with a smaller increase for the peak traffic periods to that presented in the graphs for the northern logger.

In accordance with EPA procedures for determining the RBL by way of the individual daily background levels for the relevant time periods, Table 1 below sets out the resultant levels for the logger locations.

Table 1: Unattended Noise Logger Results – dB(A)

Location	Time Period	RBL	Ambient Leq
Northern Logger	Day (7am – 6pm)	47	62
	Evening (6pm – 10pm)	43	58
	Night (10pm – 7am)	39	56
Southern Logger (elevated microphone)	Day (7am – 6pm)	53	61
	Evening (6pm – 10pm)	48	59
	Night (10pm – 7am)	44	58

Generally, Childcare Centre facilities operate on weekdays only. Elimination of the ambient data obtained during Saturdays and Sundays reveal weekday RBLs of 47 dB(A) at the northern logger and 55 dB(A) for the southern logger (elevated microphone).

The weekday RBLs are to be utilised for the establishment of noise emission targets from the Childcare Centre component in the development.

The results set out in Table 1 relate to the overall A-weighted level in accordance with EPA procedures.

With respect to the licensed premises, under the Food and Drink Industries component of the mixed-use, the criteria specified by Liquor & Gaming NSW ("L&G NSW") covers the octave band frequencies of 31.5 Hz to 8 kHz inclusive.

The loggers used for measurements (being precision sound level meters) can determine the statistical results of the octave bands for the purpose of such analysis.

Appendix E provides a graphical presentation of the L90 octave band level for Wednesday 22 June 2022 for each logger as an example of the variation in the background level in the various octave bands over a 24 hour period.

The following table of octave band result have been derived in terms of the Rating Background Level method adopted by the EPA for the day, evening, and night-time periods. As the L10 Noise Condition cover two specific periods (7am – midnight and midnight to 7am) Appendix E provides the background level (using the Rating Background Level methodology) for the LA10 Noise Condition that would be applied to licensed premises.

TABLE 2: Unattended Noise Logger RBL Results

Time Period	dB(A)	Linear Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Northern Logger										
RBL day	45	53	52	46	43	43	41	36	26	15
RBL evening	42	48	48	44	40	40	39	32	18	11
RBL night	40	47	47	41	38	38	35	27	15	11
RBL 7am – midnight	43	49	48	44	40	40	40	32	18	11
RBL midnight to 7am	39	47	46	41	37	37	35	27	15	11
Southern Logger										
RBL day	53	54	54	50	50	49	49	48	33	20
RBL evening	48	49	52	49	47	45	44	38	26	15
RBL night	44	47	49	46	44	41	40	33	23	14
RBL 7am – midnight	49	50	52	59	47	45	45	38	27	15
RBL midnight to 7am	43	47	49	46	44	41	39	33	23	14

The northern logger location was set in from the western boundary to be representative of the building alignment of residential premises on the western side of Bachell Avenue. Under EPA requirements receiver locations for the assessment of noise emitted from a site can occur at a residential boundary or any affected point on a residential property.

Appendix F presents the results of attended measurements at the site boundary at the time of the retrieval of the noise loggers and provides a time splice graph showing the variation in the A-weighted noise level over time, and a table of A-weighted statistical results in octave bands. The impact of individual traffic movements on Bachell Avenue is obvious.

The background level at the site boundary for a single 15 minute sample was 3 dB(A) higher than the daytime RBL from the logger results. This difference was attributed to a wider angle of view to the traffic for the attended monitoring location compared to the logger location as a result of shielding from walls/buildings to the north.

Comparing the range of background levels from the logger for the same time period identifies a 2dB difference when normalised over the monitoring period. This normalisation could result in a daytime RBL for the residential boundaries opposite the site of 49 dB(A).

As identified in Section 3.5 under the *Transport & Infrastructure SEPP* there are noise limits imposed upon the childcare centre component of the site. From the Department of Planning's *Interim Guideline* there is reference to the assessment of vibration from rail operations with respect to the DEC guideline.

Observations during the installation of the noise loggers observed rail traffic using the T7 line but did not detect any vibration at either logger location.

With the childcare centre being located adjacent to the north eastern boundary of the site monitoring was conducted at the northern location identified in Appendix C3 is location V1 being in proximity to the northern logger location but on the eastern side of a water drain through the property.

Attended monitoring was conducted on 27 June 2022 at location V1 for one hour. During the attended monitoring 3 trains were observed to be passing the subject site but no vibration could be perceived by the operator observing the measurements.

Appendix G presents the results of vibration monitoring where the graph presents the velocity levels and provides computations in terms of the vibration dose value. The analysis is provided by the Vibrock software accompanying the logger.

Appendix G1 presents the results for the train passby at 2:12 PM to have a maximum level of 0.725 mm/s with the resultant VDV for the event being less than 0.1 $mm/s^{1.75}$, where the acceptable vibration dose for offices, schools, education institutions and places of worship being less than 0.4 $m/s^{1.75}$.

Appendix G2 presents the vibration results occurring at location V2, being at the most south-eastern corner of the existing building, as there was no access to the northern side of the existing building that would represent the south-eastern corner of the childcare centre.

The event in Appendix G2 relates to a train passby at 3:58 to indicate a maximum vibration levels for each of the three axes to be less than 0.05 mm/s which is why no vibration could be perceived at the site.

Event 3 in Appendix G3 relates to a train passby at 10 pm on the night of 27 June 2022 and reveals for the individual three axes the maximum level of vibration to be less 0.03 mm/s.

The VDV presented for event 3 is expressed over an eight hour period as it occurred occurring in the night-time and is well under the DEC guideline limits by a significant order of magnitude.

Appendix G4 prevents the graph for the occurrence of a train passby at 6 am on 28 June 2022 where the individual maximum values for the three orthogonal axes are less than 0.04 mm/s.

The results of attended and unattended vibration measurements conducted at the site and involving interrogation of the unattended data recordings identifies that the passage of trains pass the subject site can give rise to a measurable increase above the ambient vibration levels, but the resultant vibration dose values are significantly below the DEC criteria and consistently confirm the attended observations of no perception of vibration.

Accordingly, the resultant vibration measurements at the subject site do not present an issue for the use of the various different occupancies in the proposed development with respect to the DEC guideline.

6.0 ACOUSTIC CRITERIA SPECIFIED FOR THE DEVELOPMENT

6.1 Noise Emission from the Commercial Tenancies and Mechanical Plant

As set out in Section 3.4 of this report, the cumulative noise level from the commercial tenancies, the mechanical plant and vehicle movements on-site are controlled by the project trigger noise levels in the NPfI.

The traffic movements in the car park occur underground.

Communal Loading bays are situated in the basement.

Communal and individual tenancy loading docks are located on ground level on the eastern and north eastern side of the development and are acoustically shielded to Bachell Avenue by the proposed development (see Appendix C1).

On Level 2 there are communal and individual loading docks to the east of Building B tower that are acoustically shielded to Bachell Avenue by the proposed development by way of the level 4 slab covering the entire loading dock area (see Appendices C4, C5 & C6).

The food and drink premises, the health premises and the specialised retail premises are provided fixed glazing to address external traffic and industrial noise renders noise emission from those spaces to be well below the background level.

The balance of tenancies are provided with operable windows to encourage natural ventilation. Whilst these tenancies are expected to generate minimal noise, the use of the tenancies are governed by the NPfI noise trigger levels. Their final use and fitout is subject to a separate application where consideration will need to be had to the NPFI criteria in this report.

Noise emission from patrons and activities in licensed premises is not covered by the NPfI.

The mechanical plant noise is the major noise source item governed by the project trigger noise levels.

The NPfI project trigger noise levels are in two parts, being the intrusiveness noise level, which applies to residential receivers only and the project amenity noise level which applies to residential and commercial/industrial receivers.

The nearest residential receivers are on the western side of Bachell Avenue. As the northern logger was set at the building alignment rather than increase the background level to account for the residential boundary the conservative approach has been to apply the intrusive noise target at the residential dwelling.

Table 3: Intrusiveness Noise Level Targets – dB(A)

	Day (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
Existing Residential Properties – western side of Bachell Avenue			
Rating Background Level	47	43	39
$L_{eq,15min}$ Limit	52	48	44

With respect to the amenity noise target, the nearest residential receivers to the west but south of building A would fall under the category of an urban area (see Table 2.3 of the NPfI).The amenity targets from Table 2.2 of the NPfI are 60 dB(A) in the day, 50 dB(A) for the evening period and 45 dB(A) for the night period.

For the residential receivers opposite and north of the northern logger those properties would fall under the industrial interface from Table 2.3 of the NPfI. The amenity targets from Table 2.2 of the NPfI are 65 dB(A) in the day, 55 dB(A) for the evening period and 50 dB(A) for the night period.

As the amenity and the intrusiveness noise targets provide Leq levels over different time periods, the NPfI recommends a +3 dB correction to the amenity noise target to then provide a comparison of the adjusted amenity noise target with the intrusiveness noise target. The project trigger noise level becomes the lower of those two assessments as shown in Table 4.

Table 4: Project Noise Level Targets – dB(A)

Period	Intrusiveness Noise Level	Project Amenity Noise Level
Existing Residential Properties to west fronting Bachell Avenue opposite and north of Building A		
Day (7am – 6pm)	**52 dB $L_{Aeq.15min}$ (47 + 5)**	63 dB $L_{Aeq.15min}$ (65 – 5 + 3)
Evening (6pm – 10pm)	**48 dB $L_{Aeq.15min}$ (43 + 5)**	53 dB $L_{Aeq.15min}$ (55 – 5 + 3)
Night (10pm – 7am)	**44 dB $L_{Aeq.15min}$ (39 + 5)**	48 dB $L_{Aeq.15min}$ (50 - 5 + 3)
Residential Properties to west fronting Bachell Avenue south of building A		
Day (7am – 6pm)	**52 dB $L_{Aeq.15min}$ (47 + 5)**	63 dB $L_{Aeq.15min}$ (60 – 5 + 3)
Evening (6pm – 10pm)	**48 dB $L_{Aeq.15min}$ (43 + 5)**	53 dB $L_{Aeq.15min}$ (50 – 5 + 3)
Night (10pm – 7am)	44 dB $L_{Aeq.15min}$ (39 + 5)	**43 dB $L_{Aeq.15min}$ (45 – 5 + 3)**
Industrial Premises adjacent to the site		
When in use	Not Applicable	**68 dB $L_{Aeq.15min}$ (70 – 5 + 3)**

The project trigger noise level is the lower (i.e., more stringent) value of the intrusiveness and project amenity noise levels. The relevant project trigger noise levels are highlighted as bold text in Table 4.

As noted above, the primary noise emission source relevant to the criteria in Table 4 relates to noise emission from mechanical plant. Allocation an allowance of noise from other sources on site the mechanical design targets (for the cumulative noise from all mechanical plant) should be set at 5 dB below the targets in Table 4.

Whilst the final plant is unknown at this stage of the project, for the distances between the plant and the relevant receivers identified in Table 4 there is not envisaged to be an acoustic issue by reason of typical plant noise emission levels, attenuation from plant in the basement levels, and screening around the roof top plant decks. The commercial spaces have separate air condenser units in the tenancy. The larger tenancies have air condensers located on the roof or in dedicated voids or loading dock areas.

For the DA, mechanical plant has been nominated and has been subject to an analysis to reveal the following noise controls to the proposed basement exhaust and supply fans are required:

- Car Park Exhaust Fan B2.1 - Fantech C2P140 in-line attenuators for both the inlet and discharge side of the fan.
- Car Park Exhaust Fan B1.1 - Fantech C2P160 in-line attenuators for both the inlet and discharge side of the fan.
- Car Park Exhaust Fan LG.1 - Fantech C2P125 in-line attenuators for both the inlet and discharge side of the fan.
- Car Park Exhaust Fan LG.2 - Fantech C2P125 in-line attenuators for both the inlet and discharge side of the fan.
- The plenum duct from the vertical shaft serving the basement 2 and basement 1 exhaust fans to the discharge rise on the lower ground floor is to be enlarged to provide 50mm thick acoustic insulation on all faces inside the duct.
- The vertical discharge riser from the lower ground floor to the discharge is to be enlarged to provide 50mm thick acoustic insulation on all faces inside the duct.
- Car Park Supply Fan B2.1 - Fantech RS15C in-line attenuators for both the inlet and discharge side of the fan.
- Car Park Supply Fan B1.1 - Fantech RS15C in-line attenuators for both the inlet and discharge side of the fan.
- Car Park Supply Fan LG.1 - Fantech RS15C in-line attenuators for both the inlet and discharge side of the fan.

Appendix H1 provided noise contours for the car park fans and all air condensers operating simultaneously.

6.2 Potential Sleep Disturbance Impacts

The maximum noise level events from the use of the commercial tenancies during the night time period associated with the noise of staff/patron vehicles on-site are required under

Section 2.5 of the NPfI to be assessed with respect to the following noise criteria at the nearest residential properties on the western side of Bachell Avenue, to address potential sleep disturbance impacts.

- L_{AFmax} 52 dB(A) or the prevailing RBL +15 dB(A), whichever is the greater; and
- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL + 5 dB(A), whichever is the greater.

As noted above the NPfI does not apply to licensed premises. In any event the western decks to the licensed premises on the ground floor of Building C are required to not be used after 10pm under the LA10 Noise Criteria.

From Table 2 the prevailing background level for most of the night (10pm to 7am) is 42 dB(A), but for the period of midnight to 2am drops to 39 dB(A). For operations occurring on site between 10pm and midnight the assessment criteria for sleep disturbance is an $L_{eq,15min}$ level of 47 dB(A) and a L_{Fmax} of 57 dB(A).

Childcare Centre facilities commence operations at 7:00 am and have staff arriving prior to 7:00 am to prepare for the opening of the Childcare Centre. The NPfI identifies in Section A3 that such operations occur in a "shoulder" period which have higher ambient background levels than the night-time period (because of the peak traffic in the morning).

Using the northern logger results the RBL for the period of 6am – 7am is 50 dB(A). Using that background level for the nearest residential receivers to the west of Building A gives rise to the threshold levels for assessment of sleep arousal associated for childcare centre staff arriving prior to 7am is of a maximum level of 65 dB(A) and an Leq level of 55 dB(A). From the logger results the existing L1 (15 minute) levels (because of traffic on Bachell Avenue already exceed the NPfI sleep disturbance threshold levels and therefore sleep arousal in not an issue for the child care centre.

6.3 Traffic Noise Impacts

Under the RNP the development is required to address road traffic noise intrusion into the centre and the outdoor play areas.

With the level of traffic noise recorded at the site the proposed development requires attenuation of the traffic noise to achieve acceptable internal noise levels in the various occupancies.

Under the EPA's RNP there is a requirement for the developer to address noise generated by road traffic impacting on the development.

Appendix D presents the result of the logger measurements, with a table of results for each logger location. The upper part of the table relates to ambient background L90 and Leq levels for assessments under the EPA's Noise Policy for Industry based on the individual 15 statistical measurement results.

The northern logger was set in from the Bachell Avenue boundary to correspond to the residential building alignment opposite the logger. The lower part of the summary table of the logger results present data in terms of the EPA's RNP that considers traffic noise for collector and arterial roads in terms of a 15 hour period (daytime) and a 9 hour (night time) when assessed as a façade reflected noise level.

The road traffic noise level results from the northern logger gave for the traffic daytime period an $L_{Aeq\ 15\ hrs}$ of 64 dB and for the traffic night time period an $L_{Aeq\ 9\ hrs}$ of 58 dB.

The existing road traffic noise levels exceed the recommend EPA limits. For the additional traffic as a result of the development the + 2dB(A) criterion applies.

One week of traffic counts for Bachell Avenue were recorded at a location 15 metres north of Rawson Road from 24 June 2023 and summaries by Lyle Marshall & Partners Pty Ltd (Traffic Engineers) to identify for the week an average daily traffic count of 2350 vehicles (two way) and an average speed of 55 km/hr

Lyle Marshall & Partners Pty Ltd (traffic engineers) have identified that the development will generate an additional average of 3112 movements per day (2990 movements in the traffic day period and 122 in the traffic night period). Peak hour traffic split for the roundabout is 88% to/from the south and 12% to/from the north.

The introduction of a roundabout at the entry/exit of the car park for the development will reduce the speed of the traffic along the width of the development.

In terms of traffic noise assessments the base level is a function of traffic volume and traffic speed.

If one assumes the additional traffic has the above 88%/12% split in direction the volume of traffic to/from the south will result in a significantly lower speed south of the roundabout during the daytime period. Northbound traffic will accelerate out of the roundabout and southbound traffic (from the north and entering the site) will reduce to less than 10km/hr at the roundabout.

The application of an average speed of 35 km/hr for the traffic south of the roundabout during the daytime 15 hour period will result in an increase of 1.96 dB(A). For the night time period the lower volume of traffic has been assumed to maintain the average speed of 55 km/hr and would give rise to an increase of 0.94 dB(A) for the nighttime 9 hour assessment period.

The application of an average speed of 55 km/hr for the traffic north of the roundabout during the daytime 15 hour period will result in an increase of 0.76 dB(A). For the night time and assuming the average speed of 55 km/hr and would give rise to an increase of 0.14 dB(A) for the nighttime 9 hour assessment period.

The installation of the large roundabout identified in Appendix C1 for the traffic split determined by Lyle Marshall & Partners Pty Ltd (traffic engineers) and the subsequent reduction of traffic speed south of the roundabout results in compliance with the RNP traffic criteria.

For the outdoor play areas of the child care centre the elevated level of the centre and the required safety barriers around the outdoor play area provide significant acoustic shielding to satisfy the RNP target for outdoor play areas.

Utilising the logger results permits specification of the glazing for different occupancies/different facades. For the commercial operation of the mixed use development the design for the daytime use is the appropriate method for determining the glazing requirements.

For the eastern side of the development the ambient daytime levels (for the elevated logger microphone) are relatively steady the whole day, because of the overall noise from the industrial areas to the north, east and south east. For the same traffic time periods the façade reflected levels area an $L_{Aeq\ 15\ hrs}$ of 63 dB for the day period and an $L_{Aeq\ 9\ hrs}$ of 60 dB for the night period.

Australian Standard 2107-2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors* identifies in Clause 2.1 that the Standard is applicable for the selection and assessment of building components that exclude noise external to the building (e.g., traffic noise).

The previous version (2000) of the Standard provided a Satisfactory and a Maximum recommended internal level for different types of occupancy/activity. The current version of the Standard provided a design sound level range for Office Buildings (2016) and an upper limit for Shop buildings.

The current version of the Standard provides qualification under Clause 2.2 that the Standard is not intended for the prescription of acceptable recommended noise levels from road traffic. But then refers to AS 3671 Acoustics – Road traffic noise intrusion – Building siting and construction that relies upon the recommend internal noise levels set out in AS 2107.

The following extract from Table 1 of AS 2107-2016 provides the recommended internal levels for different spaces .

TABLE 5: Internal Noise Levels for different occupancies

Item	Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range
5	OFFICE BUILDINGS	
	Executive office	35 to 40
	General office area	40 to 45
	Open plan office	40 to 45
	Public Spaces	40 to 50
	Reception areas	40 to 45
6	PUBLIC BUILDINGS	
	Restaurants and cafeterias-	
	Cafeterias	40 to 50
	Food courts	45 to 55
	Coffee shops	40 to 50
	Restaurants	40 to 50
8	SHOP BUILDINGS	
	Department Stores-	
	Main floor	< 55

Item	Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range
	Upper floor	< 50
	Small retail stores (general)	<50
	Shopping malls	<55
	Specialty shops (where detailed discussion is necessary in transactions)	<45

The specification of glazing is not in terms of a dB(A) level but an Rw parameter (previously an STC). Depending upon the frequency content of the traffic the correction between and Rw and a dB(A) level varies between 5 and 7 dB. The higher performance generally relates to a higher ratio of heavy vehicles.

Table 6 presents the Rw performance of glazing for the relevant facades. The Rw value applied is for the mean of the range of levels from AS 2107.

Table 6: Glazing Performance

Type of occupancy/activity	Design Sound Level ($L_{Aeq,t}$) range	Bachell Avenue	Northern and Eastern Facades
	dB(A)	Rw	Rw
OFFICE BUILDINGS			
Executive office	35 to 40	33	32
General office area	40 to 45	28	28
Open plan office	40 to 45	28	28
Public Spaces	40 to 50	25	24
Reception areas	40 to 45	28	28
PUBLIC BUILDINGS			
Restaurants and cafeterias-			
Cafeterias	40 to 50	25	24
Food courts	45 to 55	22	23
Coffee shops	40 to 50	25	24
Restaurants	40 to 50	25	24

Type of occupancy/activity	Design Sound Level ($L_{Aeq,t}$) range	Bachell Avenue	Northern and Eastern Facades
	dB(A)	Rw	Rw
SHOP BUILDINGS			
Department Stores-			
Main floor	< 55	20	20
Upper floor	< 50	20	20
Small retail stores (general)	<50	20	20
Shopping malls	<55	20	20
Specialty shops (where detailed discussion is necessary in transactions)	<45	25	25
Bars and lounges	<50	22	2

The following glazing thickness can be applied for the application noise reduction:

- the provision of 6.38mm laminated glass achieves an Rw of 33,
- the provision of 10.76mm laminated glass achieves an Rw of 36,
- the provision of 12.76mm laminated glass achieves an Rw of 37,
- double glazing of 10.38mm + 6mm with 40mm air gap achieves Rw of 44

From Table 6 in acoustic terms for general office areas 6.38mm glass would suffice noting that as a general concept for glazing, many windows will be governed by weight per size.

6.4 Licensed Premises

As noted above, noise from mechanical plant associated with licensed premises is subject to noise limits derived from the NPfI. Noise from the use of the premises (patron noise and music) fall under criteria issued by the Liquor Authority (the LA10 Noise Limit discussed in Section 3.5).

The LA10 limit only applies to residential receivers.

As identified previously in this assessment the logger results for the northern logger have been used for the background levels applicable for the nearest residential receivers on the western side of Bachell Avenue.

As the logger octave band results were obtained using linear frequency spectra. The following table presents the noise criteria for the assessment of the licensed premises as A-weighted values. It is noted that the LA10 noise limit applies to individual licensed premises not the cumulative impact of all licensed premises.

TABLE 7: Acoustic Criteria for Licensed Premises – existing ambient levels

Time Period	dB(A)	A-weighted Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Residential dwelling west side of Bachell Avenue										
RBL 7am – midnight	45	15	27	33	36	42	45	38	24	15
RBL midnight to 7am	39	-2	20	25	28	34	35	28	16	10

Normally the L10 Noise Criteria applies for individual licenced premises with no adjustment for other nearby premises.

It is proposed that Building C ground floor tenancies (internally accessed to level 1) will be drink and dine establishments.

To accord with cumulative noise emission concept for the development, for the residential area to the west the criteria in Table 7 has been allocated for all 7 licensed premises, thereby requiring the target for each individual licensed premises on Bachell Avenue to have individual noise contributions at residential premises 8 dB below the limits set out in Table 7.

Appendix H2 presents noise contours for the use of nominated seating for the western terrace and eastern terrace, and 40 patrons with the western doors open in each of the ground floor tenancies CG.01 – CG.06 and 40 patrons in the first floor tenancies CG.01 – CG.5 , and the eastern ground floor doors open. Tenancy CG.07 does not have operable doors on the western or northern façade and has been assessed for 160 patrons. In all cases we have considered 50% of the patrons for each tenancy to be speaking in a raised voice (Scenario 1).

The noise contours shown in Appendix H2 for all 7 tenancies simultaneously operating satisfy the A-weighted noise targets for the residential receiver locations on the western side of Bachell Avenue. On an octave basis Scenario 1 gives rise to marginal exceedances

in the 4kHz and 8kHz octave bands leading to the requirement to close all the western terraces (CG.01 – CG.06) by 10pm.

Appendix H3 presents noise contours for the use of nominated seating for the eastern terrace, and 80 patrons in each of the tenancies CG.01 – CG.05 and 40 patrons in CG.06 with the western doors closed, and the eastern doors open. Tenancy CG.07 been assessed for 160 patrons. In all cases we have considered 50% of the patrons for each tenancy to be speaking in a raised voice (Scenario 2).

The noise contours shown in Appendix H3 for all 7 tenancies simultaneously operating satisfy the after midnight A-weighted noise targets for the residential receiver locations on the western side of Bachell Avenue. On an octave basis Scenario 2 fully satisfies the after midnight octave band requirements.

6.5 Level 5 Terrace and Half Basketball Court

Level 5 has a terrace on the Bachell Avenue side of the site that spans across Buildings C & D. The terrace has a café and will be open to the general public. The terrace area has 1.8m high glass balustrading to the southern, western, and northern perimeters of the terrace area that with the elevated nature of Level 5 will result in substantial acoustic shielding and distant attenuation to the residential receivers on the western side of Bachell Avenue.

Level 7 has a half basketball court on the top of Building D.

Under Section 1.5 of the NPfI patron noise from premises and noise from sporting facilities are not covered by the NPfI.

The use of Level 5 Terrace and the Half Basketball Court is not envisaged to create an acoustic impact.

Appendix H4 presents the noise level contours for 88 people distributed across the Level 5 terrace where 50% of the people are talking in a normal voice, and 6 players (3 on 3) on the half basketball court with 10 spectators talking in a raised voice. Noise data from the play of the half basketball court has been taken from the operation of a half basketball courts at the Vic on the Park Hotel at Marrickville and the Alexandria Hotel at Redfern.

As expected, the noise levels shown in Appendix H4 are all below the background levels shown in Table 1 for the northern logger and confirm the use of these two areas do not impact upon the NPfI noise targets even the use of these two areas was included in the NPfI assessment.

6.6 Child Care Centre

The primary acoustic issue for child care centres relates to noise emitted from the outdoor play areas.

Under the AAAC Guideline for the use of unlimited outdoor play the noise target for outdoor play for the residential area to the west of the child care centre is 47 + 5 = 52 dB(A).

With the Child Care Centre located on Level 5 there is a significant degree of acoustic shielding and distance attenuation to the residential receivers.

Appendix H5 presents the resultant noise contours (Lima Predictor Noise Model) from 36 x 0-2 year old children and 20 x 2-3 year old children using the western outdoor play area (in active play) plus 50 x 3-5 year old children using the eastern outdoor play area (all in active play) to result in Leq levels below the daytime background level at the residential reference locations.

The traffic volume determined for the child care centre is 205 movements in the day period and 9 movements between 6am and 7am.

Whilst under the RNP Bachell Avenue is assessed as a sub-arterial road utilising the 15 hour (7am-10pm) Leq parameter, the AAAC Guideline requires the traffic for drop off and pickups to be assessed as a 1hour Leq separate to the subject development.

Under the existing traffic counts the AM peak period for drop off (8am – 9am) has an averaged weekday traffic count of 155 vehicles. The northern logger results identify a 1hr Leq between 8am and 9am to be 60 dB(A) that when corrected to a façade reflected level is above the EPA's recommend level for a local road. This results in a noise target not exceeding 2 dB(A) above the existing level.

Under RTA assessment procedures the AM peak period for the child care centre will have 42 vehicle movements, whilst the afternoon pickup peak period has a lower hour count by reason of the pickup period occurring over a longer time.

For the morning drop off on a logarithmic basis the additional traffic would give rise to a 1 dB increase in the current traffic level without any consideration of the reduction in speed for the roundabout.

If the additional traffic for the drop off for the children care centre is considered in terms of the 15 hour Leq traffic criteria (from the RNP) applicable to Bachell Avenue the additional traffic as a result of the child care centre is insignificant.

The arrival of vehicles to the child care centre prior to 7am only relates to the noise contribution from such vehicles when on the site. As the vehicles would enter the carpark the on-site noise contribution would be below the background level and satisfy the background + 15 dB(A) limit (at residential receivers) by a substantial margin.

The glazing to the child care centre is to be not less than 6.38mm laminated glass to satisfy the RNP internal traffic noise criteria.

The cumulative impact of indoor noise + mechanical plant + onsite traffic is below the daytime background levels at the nearest residential receivers.

The operation of the proposed child care centre satisfies all the acoustic criteria applicable to the centre by a significant margin.

7.0 CONCLUSION

The proposed development for the subject site of 2 Bachell Avenue, Lidcombe is contained in a E3 Productivity Support zone that is subject to the Cumberland Development Control Plan.

The nearest residential dwellings to the subject site are on the western side of Bachell Avenue, whilst the north eastern and south eastern boundaries abut industrial zoned land.

For the proposed development there are several acoustic criteria that are applicable to the development, dependent upon the type of the noise source or occupancy in question.

To derive the appropriate noise targets based upon the relevant guidelines/policies pertaining to different types of noise it was necessary to undertake ambient noise measurements at the subject site to determine the background noise level (in accordance with EPA policies) and the traffic noise levels.

From the ambient noise measurements that have been undertaken at the subject site the relevant noise targets for the different types of noise sources have been determined as set out in this report.

The DCP refers to the *Noise Policy for Industry*. The NPfI identifies certain noise sources not covered by the policy. With respect to the proposed development the NPfI is primarily related to mechanical plant noise. An overall noise target for all mechanical plant at the subject site has been identified with respect to the nearest residential receivers on the western side of Bachell Avenue.

The noise targets for the north eastern and south eastern boundaries are not related to the intrusiveness target and use the amenity noise target for industrial premises.
For the application a preliminary mechanical plant design has been the subject of an assessment and with the nominated noise controls for the car park ventilation the plant fully compliance with the design targets.

The mechanical plant associated with the licensed premises forms part of the overall plant noise governed by the *Noise Policy for Industry*.

Noise from patrons and music associated with any licenced restaurants falls under the LA 10 Noise Criteria issued by the Liquor Authority. The assessment of noise from the 7 licensed premises identified the western terrace and the western doors to the drink and dine premises is to be closed by 10pm.

As the subject development is located adjacent Bachell Avenue and the IN1 zoned industrial area, and rail infrastructure (SP2 zone), it is necessary to provide appropriate acoustic insulation for the façades of the development to obtain satisfactory internal acoustic amenity. Internal reference levels for the design targets have been extracted from Australian Standard AS 2107 – 2016.

As the subject site is in a planning stage this acoustic assessment report sets out the noise targets for the entire development to which further acoustic assessments may be required prior to the issue of a construction certificate.

For the evaluation of the feasibility of the development assessments of mechanical, plant, licensed premises and the child care centre have been undertaken and identifies full compliance with the noise targets.

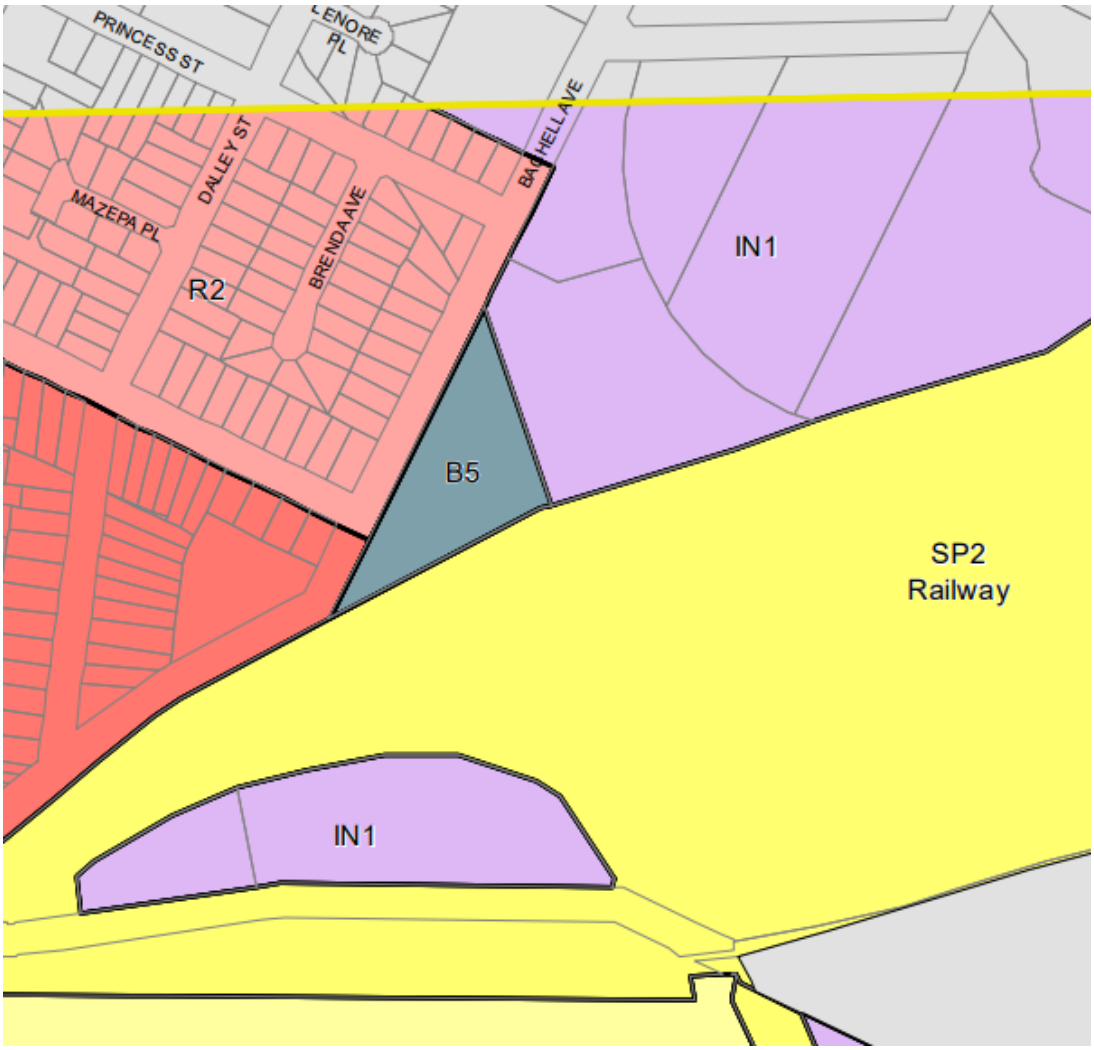
Subsequent development applications for various components of the development can utilise the noise data and noise targets provided in this report.

Yours faithfully,

THE ACOUSTIC GROUP PTY LTD

STEVEN E. COOPER

APPENDIX A: Extract of Cumberland LEP 2021 Land Zoning Map

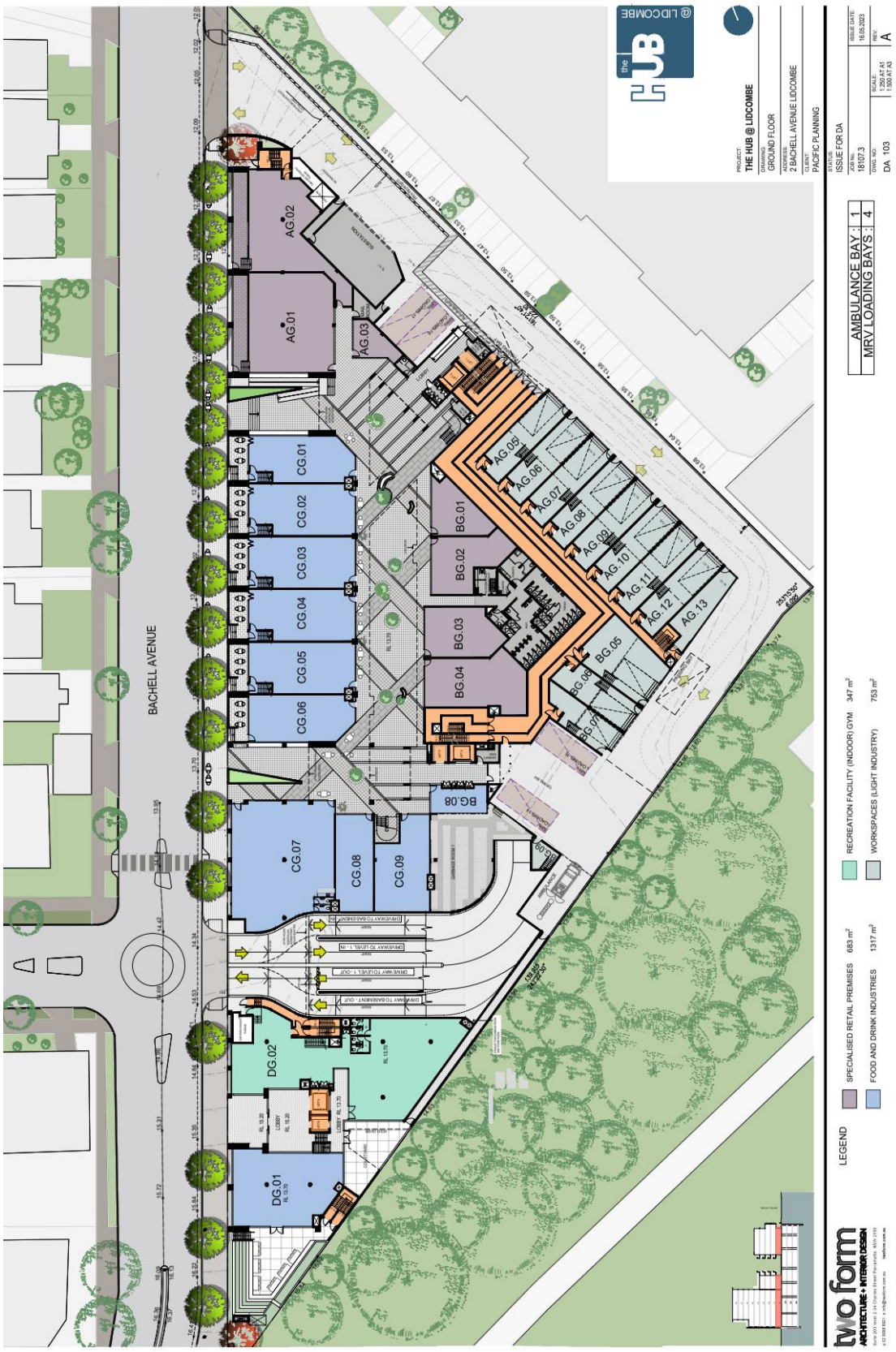


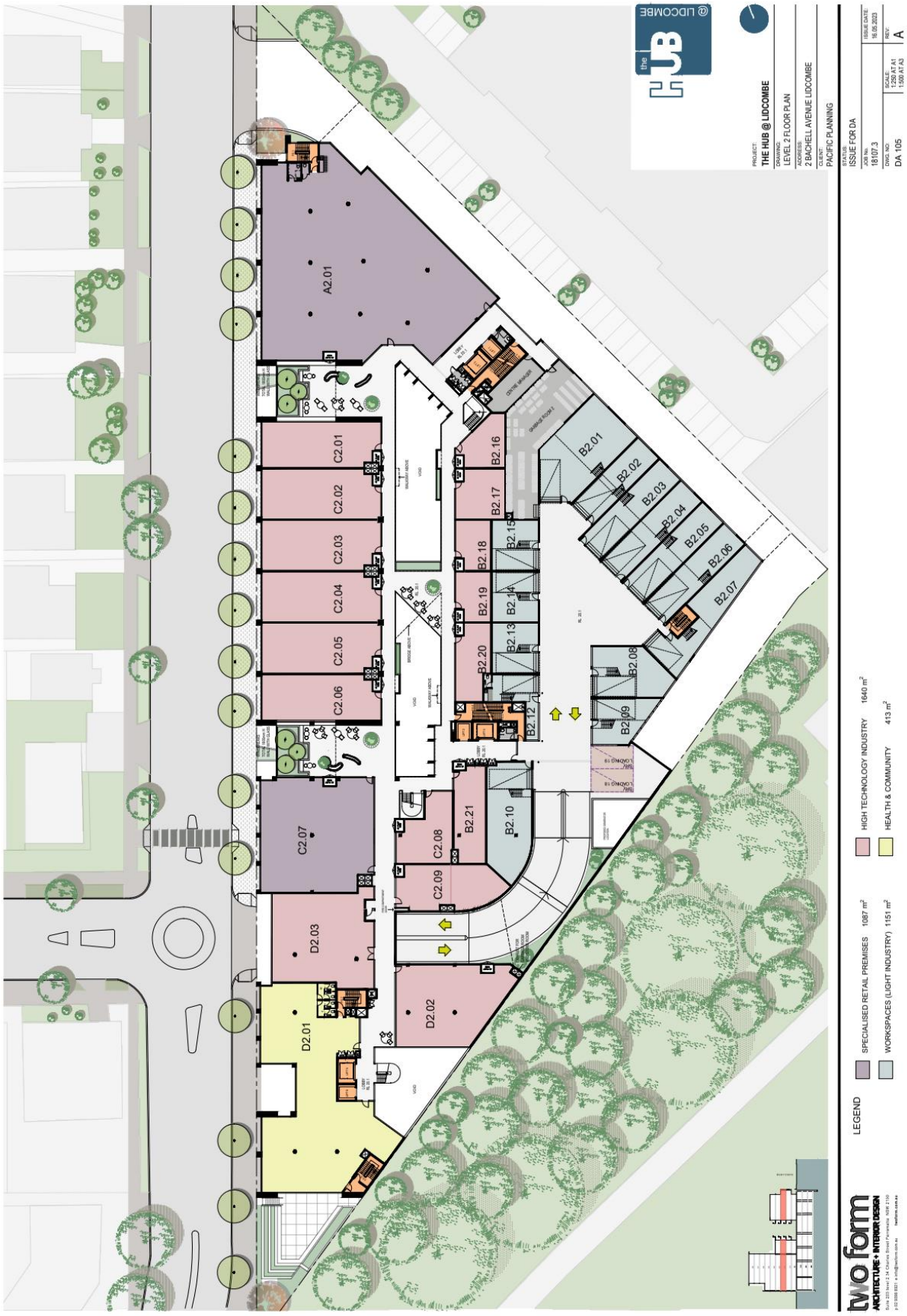
Land Zoning Map - Sheet LZN_016

Zone

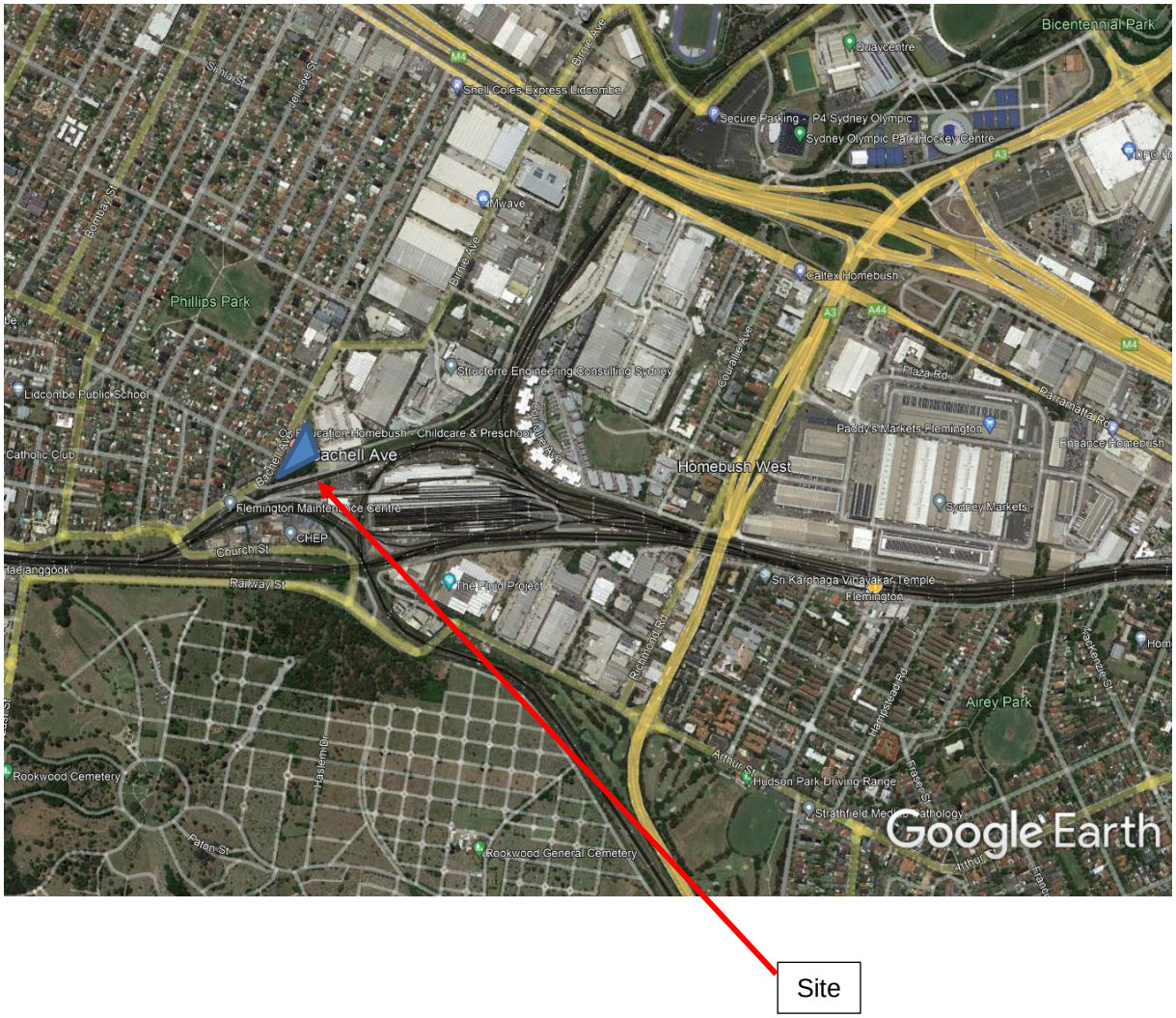
- B1 Neighbourhood Centre
- B2 Local Centre
- B4 Mixed Use
- B5 Business Development
- B6 Enterprise Corridor
- E2 Environmental Conservation
- IN1 General Industrial
- IN2 Light Industrial
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- SP1 Special Activities
- SP2 Infrastructure

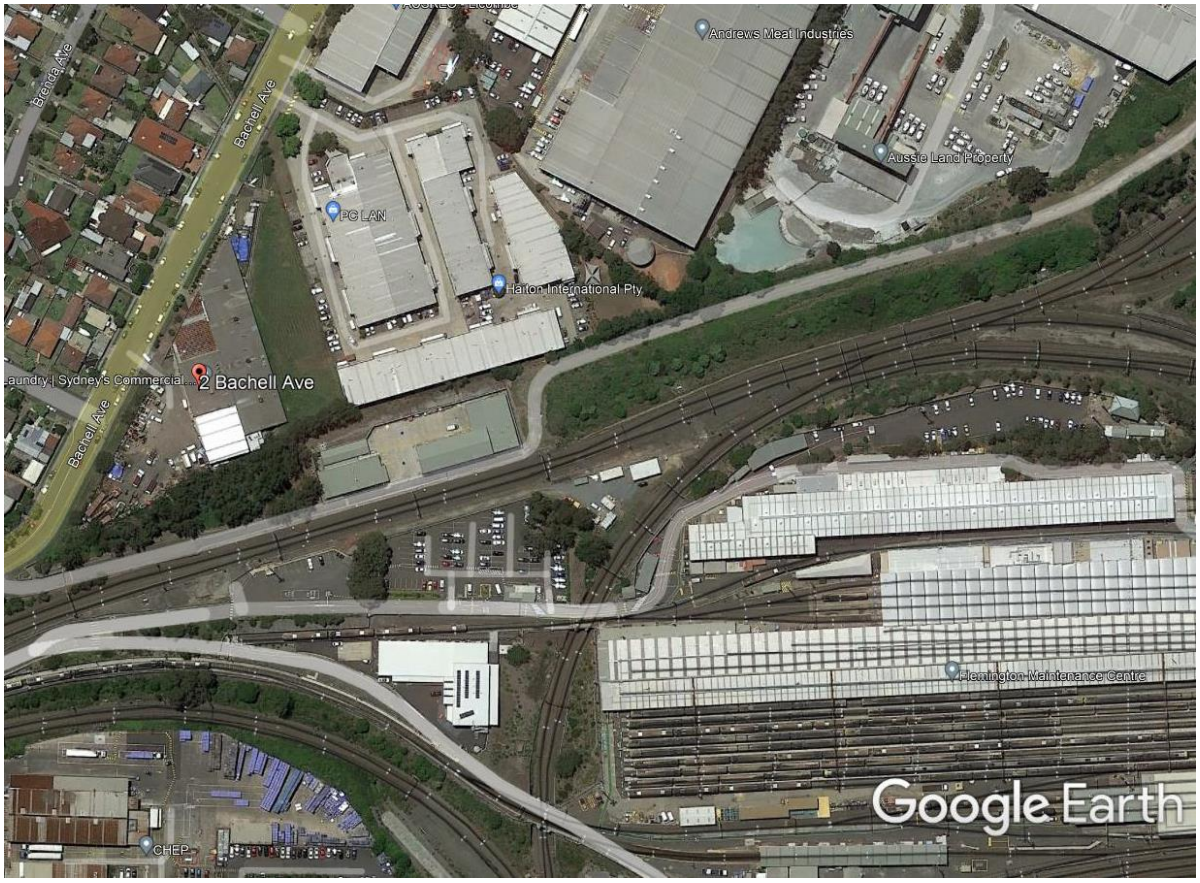
APPENDIX B: Ground Floor Plan and Plans for Levels 1-4





APPENDIX C: Site and Measurement Locations





Unattended (Logger) Noise Measurement Locations

Unattended and Attended Vibration Measurement Locations

Attended Noise Measurement Location

APPENDIX D: Noise Logger Results

2 Bachell Avenue Lidcombe

Job Number: 5499
Instrumentation: SVAN 979 S/N 35808
Logger Location: Northern logger
Free Field: yes
Monitoring Period: Thursday 16 June 2022 to Sunday 26 June 2022

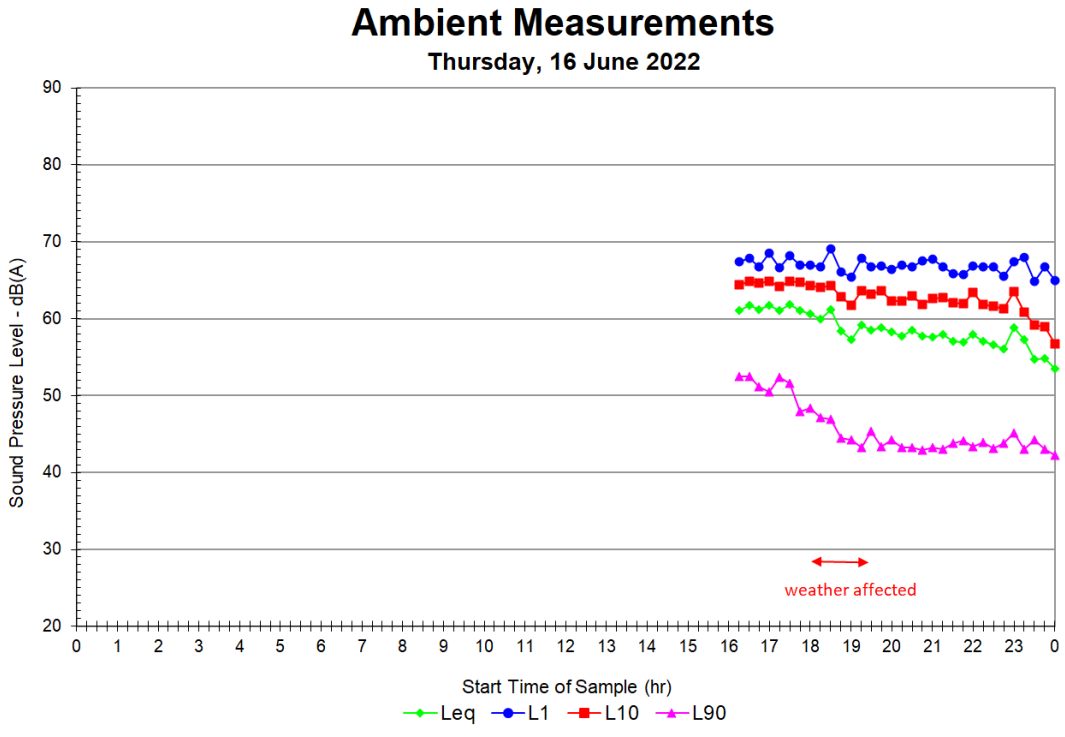
BACKGROUND AND AMBIENT NOISE MONITORING RESULTS
NSW EPA's NOISE POLICY FOR INDUSTRY, 2017

Day	L90 Background Noise Levels			Leq Ambient Noise Levels		
	Day 7am - 6pm	Evening 6pm - 10pm	Night 10pm - 7am	Day 7am - 6pm	Evening 6pm - 10pm	Night 10pm - 7am
Thursday 16 June 2022	*	*	40.8	*	58.7	56.7
Friday 17 June 2022	*	*	*	59.7	58.5	56.3
Saturday 18 June 2022	45.1	39.8	36.7	59.8	56.7	54.6
Sunday 19 June 2022	*	40.6	36.1	59.3	59.4	56.6
Monday 20 June 2022	46.7	42.6	39.3	66.0	57.0	55.5
Tuesday 21 June 2022	46.5	*	38.1	66.4	58.6	56.4
Wednesday 22 June 2022	46.7	43.5	40.1	61.8	58.5	57.0
Thursday 23 June 2022	48.1	43.9	41.5	62.5	58.9	57.2
Friday 24 June 2022	*	44.4	39.3	61.9	59.4	55.4
Saturday 25 June 2022	44.2	42.8	39.3	59.7	56.9	53.8
Sunday 26 June 2022	41.2	42	*	58.2	56.2	*
RBL Median	**46.5**	**42.7**	**39.3**	-	-	-
Log Average	**-**	**-**	**-**	**62.4**	**58.2**	**56.1**

TRAFFIC NOISE MONITORING RESULTS
DECCW's NSW Road Noise Policy 2011

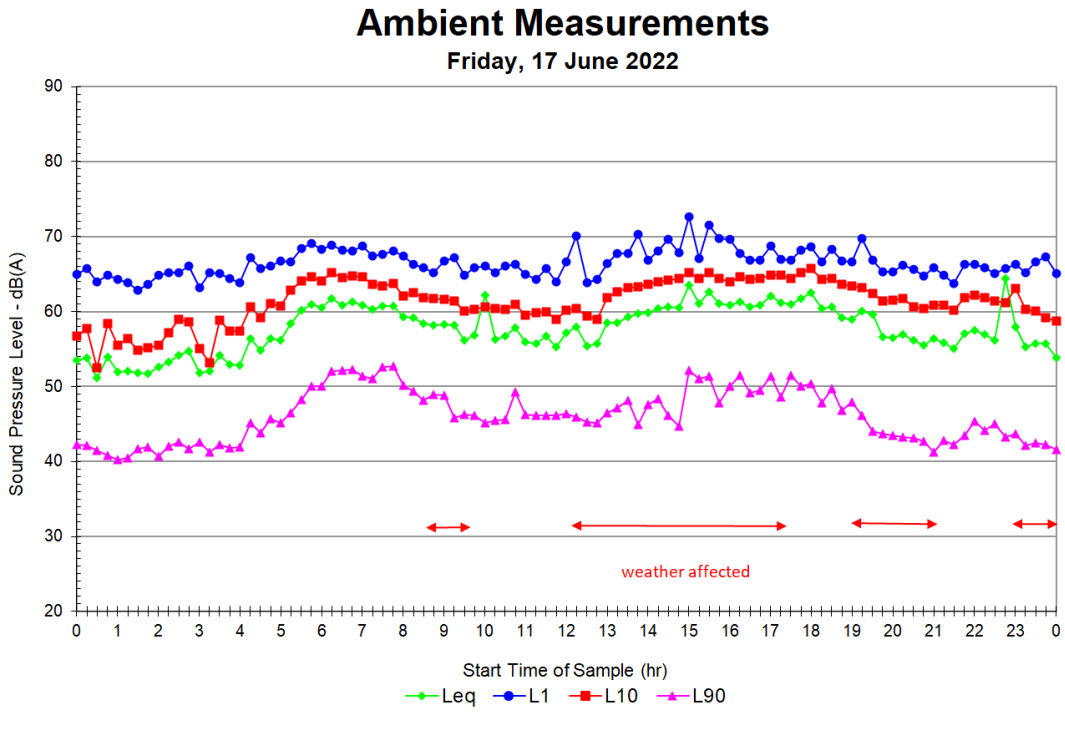
Day	Leq Ambient Noise Levels		Leq 1 Hr Noise Levels			
	Day 7am - 10pm	Night 10pm - 7am	Day - Max	Day - Min	Night - Max	Night - Min
Thursday 16 June 2022	*	59.2	*	*	63.6	54.4
Friday 17 June 2022	61.9	58.8	64.7	58.4	62.8	53.9
Saturday 18 June 2022	61.7	57.1	63.0	57.7	59.7	54.3
Sunday 19 June 2022	61.8	59.1	64.0	60.3	63.2	54.6
Monday 20 June 2022	67.4	58.0	73.9	58.8	62.8	52.4
Tuesday 21 June 2022	67.8	58.9	72.6	59.5	63.3	53.5
Wednesday 22 June 2022	63.6	59.5	68.1	59.5	64.5	54.7
Thursday 23 June 2022	64.2	59.7	66.9	59.4	64.7	55.1
Friday 24 June 2022	63.9	57.9	69.5	59.8	61.9	53.8
Saturday 25 June 2022	61.6	56.3	62.9	58.2	58.2	53.1
Sunday 26 June 2022	60.3	44.4	*	57.9	54.0	*
Log Average	**63.7**	**57.8**	**69.1**	**59.0**	**62.5**	**54.0**

* indicates an incomplete set of data for a given time period
# Nighttime for a given day continues through to the following morning



2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

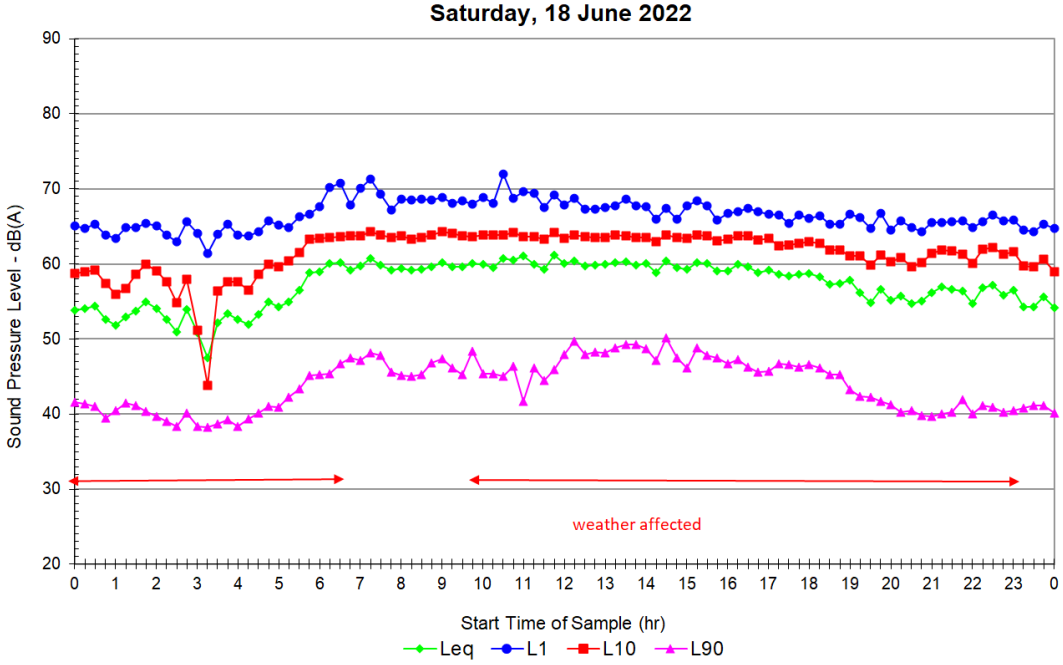


2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

Ambient Measurements

Saturday, 18 June 2022

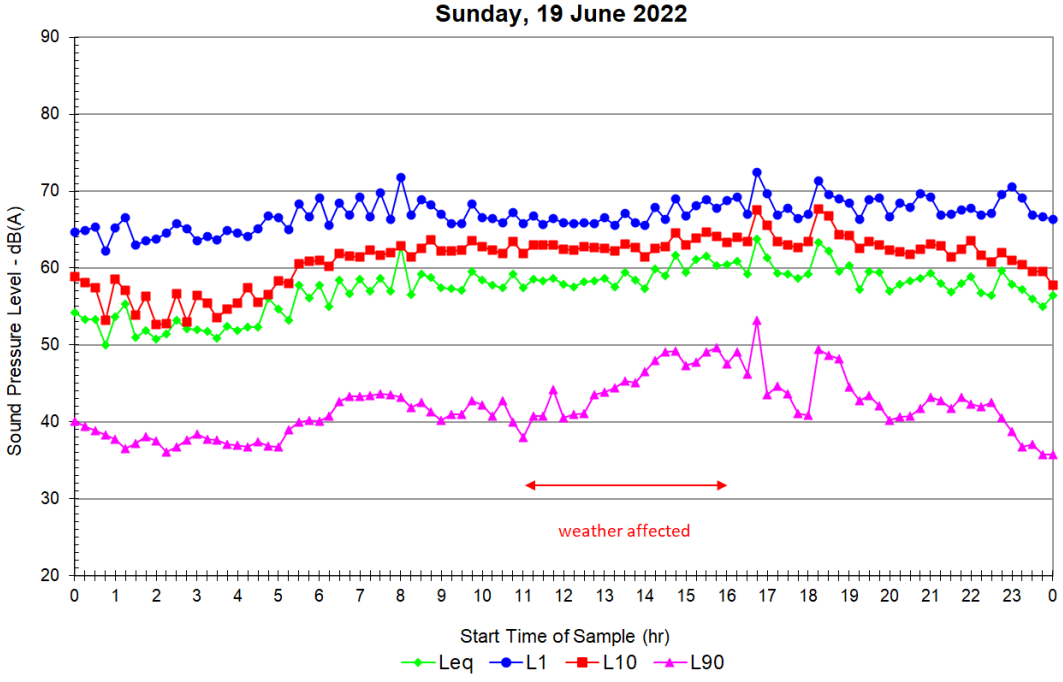


2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

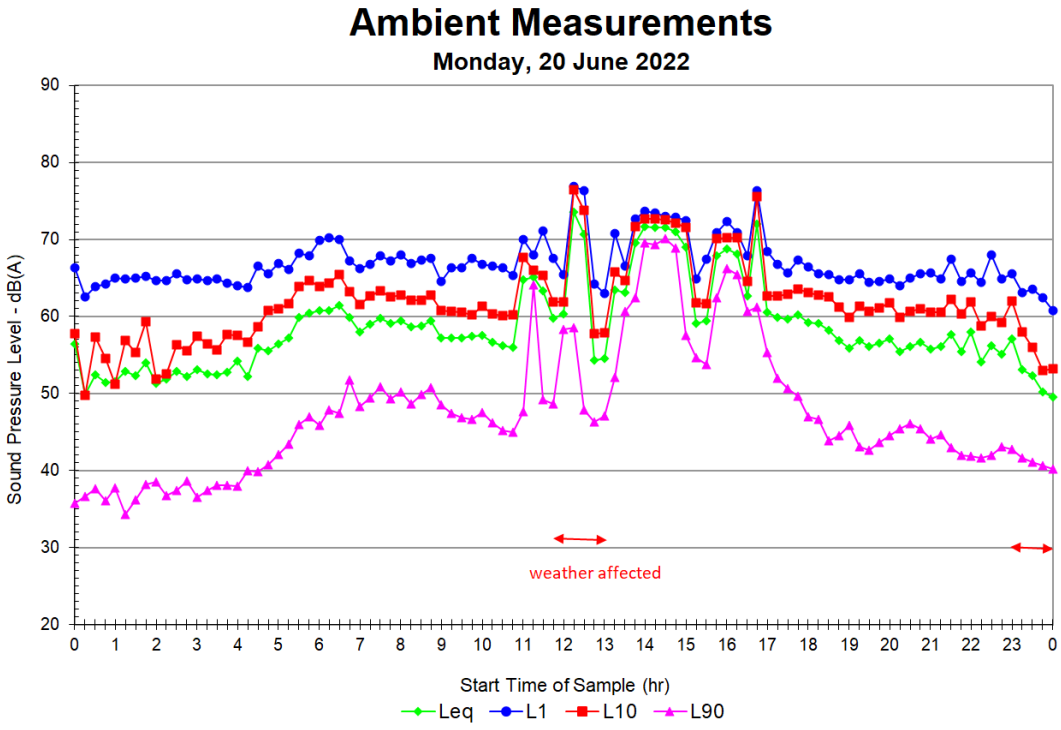
Ambient Measurements

Sunday, 19 June 2022



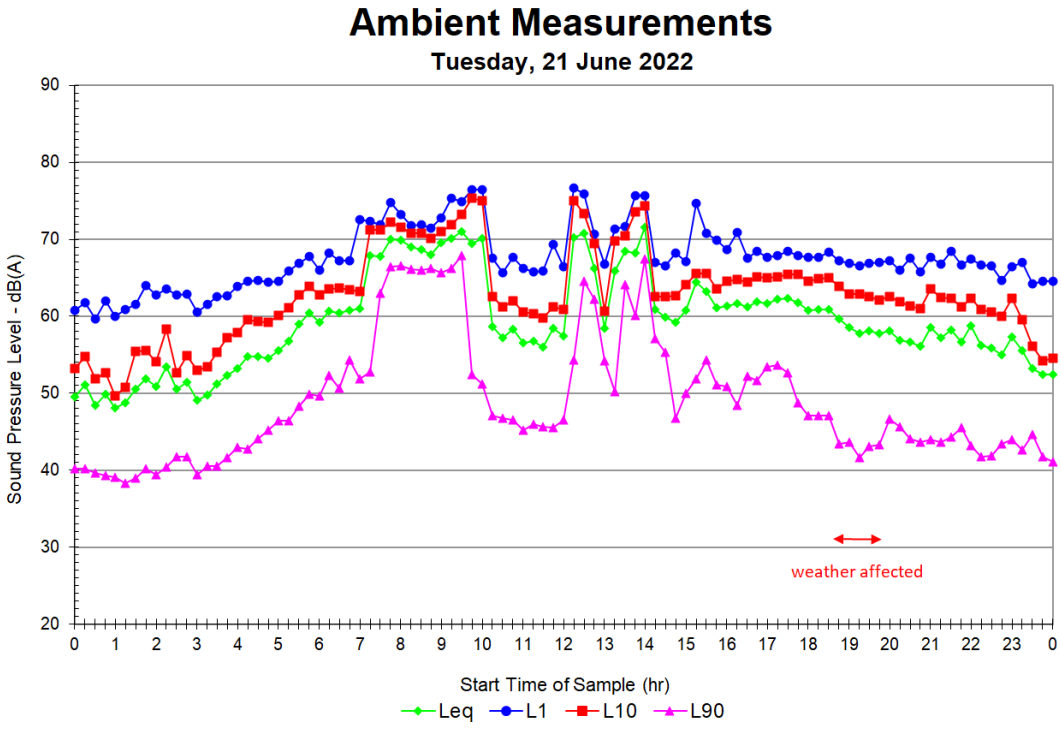
2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger



2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

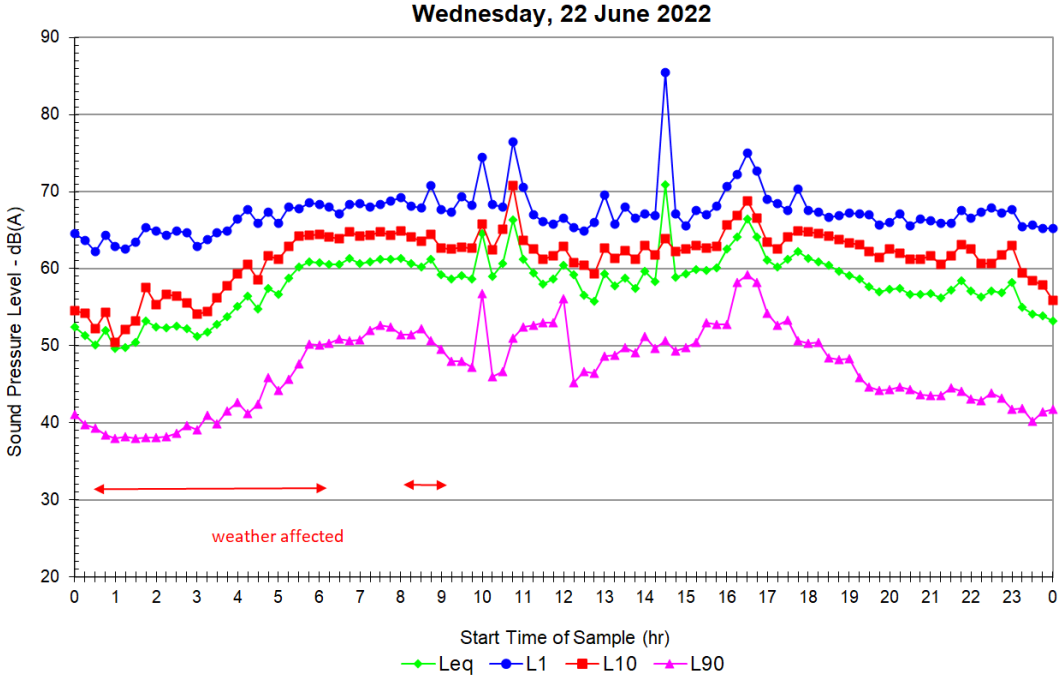


2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

Ambient Measurements

Wednesday, 22 June 2022

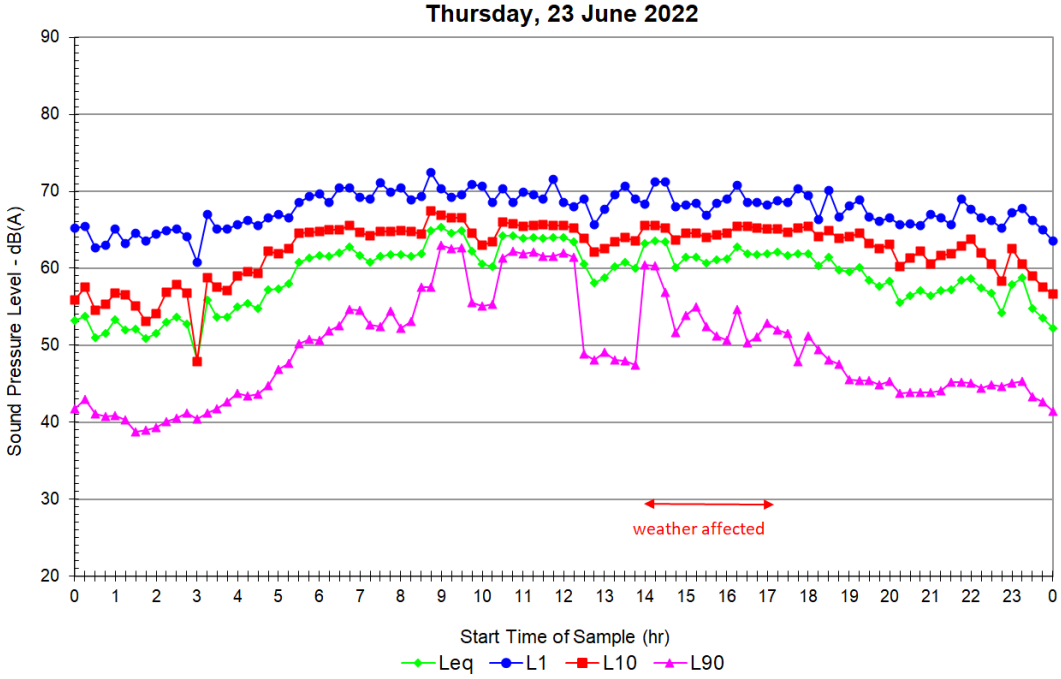


2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

Ambient Measurements

Thursday, 23 June 2022

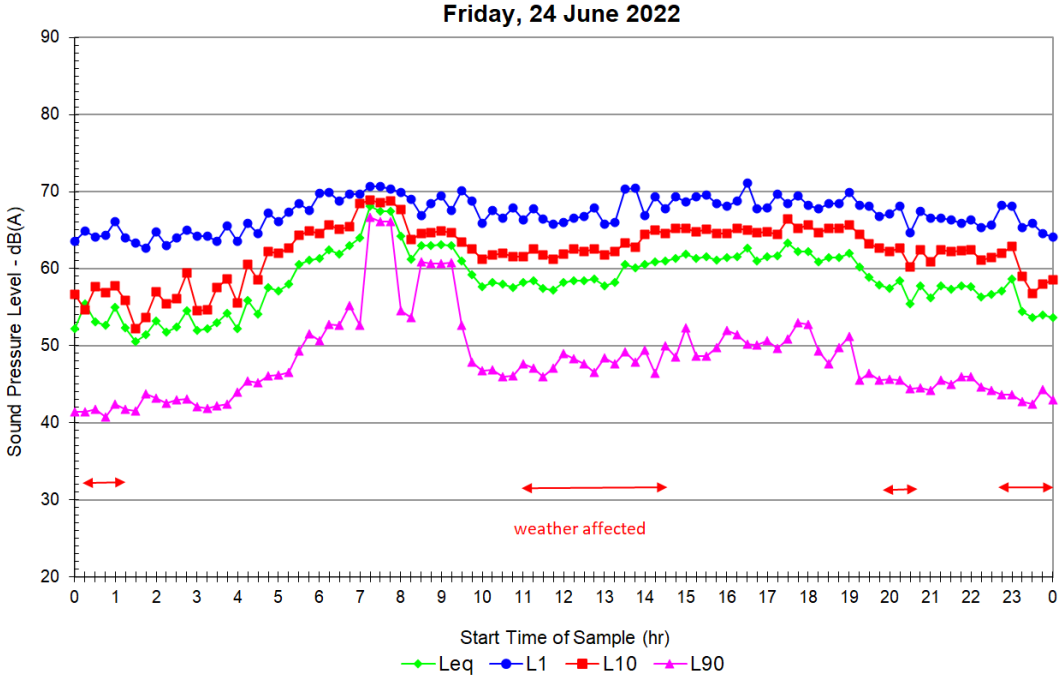


2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

Ambient Measurements

Friday, 24 June 2022

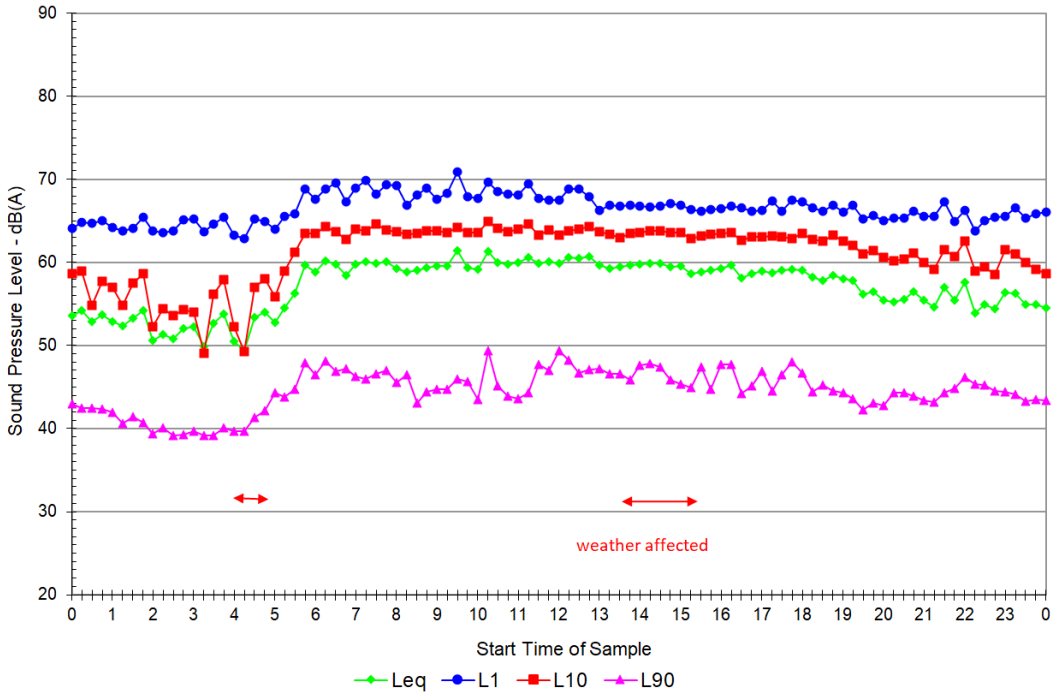


2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger

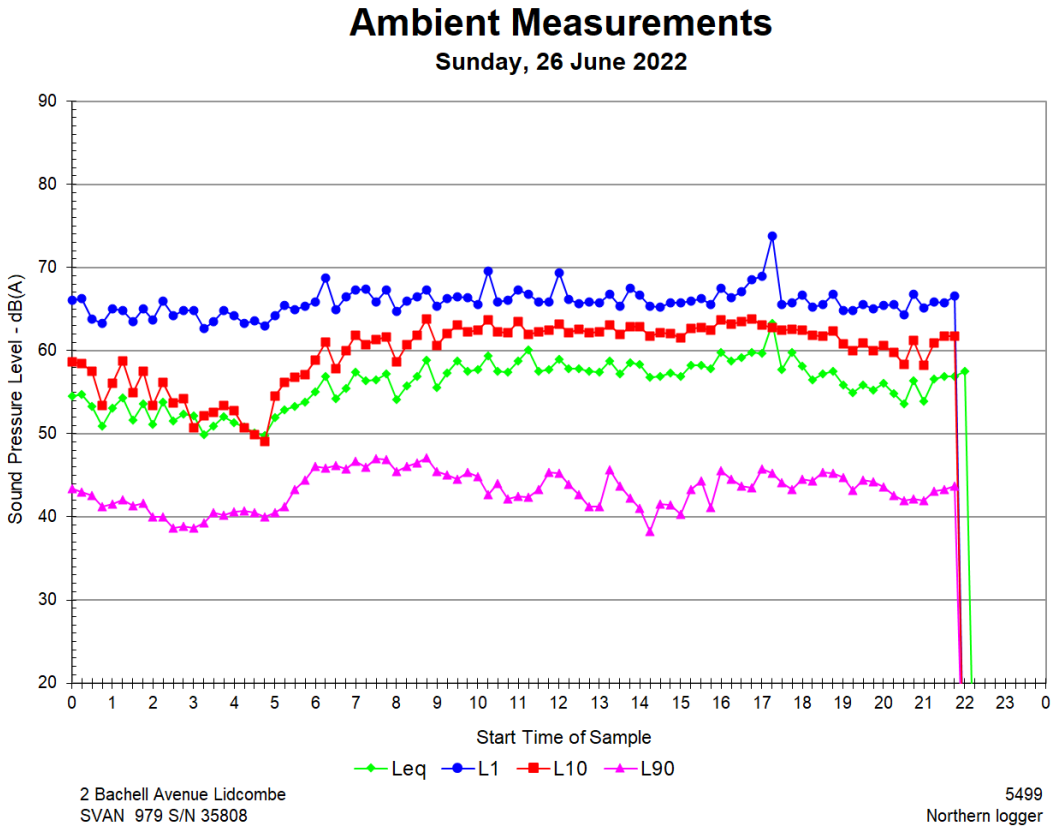
Ambient Measurements

Saturday, 25 June 2022



2 Bachell Avenue Lidcombe
SVAN 979 S/N 35808

5499
Northern logger



2 Bachell Avenue Lidcombe

Job Number: 5499
Instrumentation: SVAN 977A S/N 92182
Logger Location: Southern logger (elevated at 10m)
Free Field: yes
Monitoring Period: Thursday 16 June 2022 to Monday 27 June 2022

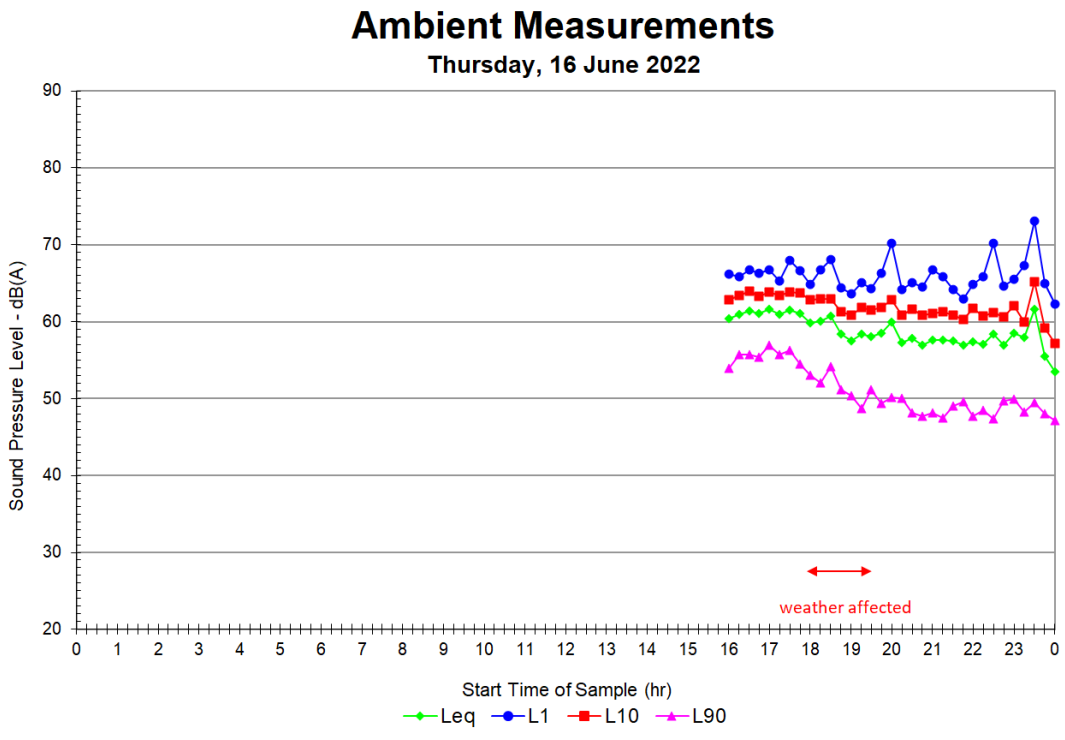
BACKGROUND AND AMBIENT NOISE MONITORING RESULTS
NSW EPA's NOISE POLICY FOR INDUSTRY, 2017

Day	L90 Background Noise Levels			Leq Ambient Noise Levels		
	Day 7am - 6pm	Evening 6pm - 10pm	Night 10pm - 7am	Day 7am - 6pm	Evening 6pm - 10pm	Night 10pm - 7am
Thursday 16 June 2022	*	*	47.0	*	58.5	58.4
Friday 17 June 2022	*	*	*	61.5	58.8	56.7
Saturday 18 June 2022	50.5	44.0	41.4	59.9	56.4	54.5
Sunday 19 June 2022	*	45.9	43.0	58.9	59.0	57.7
Monday 20 June 2022	55.1	49.5	44.9	61.7	59.0	59.4
Tuesday 21 June 2022	55.4	*	43.3	62.7	59.2	57.9
Wednesday 22 June 2022	52.7	48.4	44.9	61.6	59.7	59.1
Thursday 23 June 2022	55.3	48.3	46.6	61.8	59.1	58.4
Friday 24 June 2022	*	48.3	43.5	62.6	59.7	56.9
Saturday 25 June 2022	49.8	48.1	43.6	60.5	58.9	56.4
Sunday 26 June 2022	46.8	47.8	*	59.8	58.5	57.6
RBL Median	**52.7**	**48.2**	**43.6**	-	-	-
Log Average	**-**	**-**	**-**	**61.3**	**58.9**	**57.7**

TRAFFIC NOISE MONITORING RESULTS
DECCW's NSW Road Noise Policy 2011

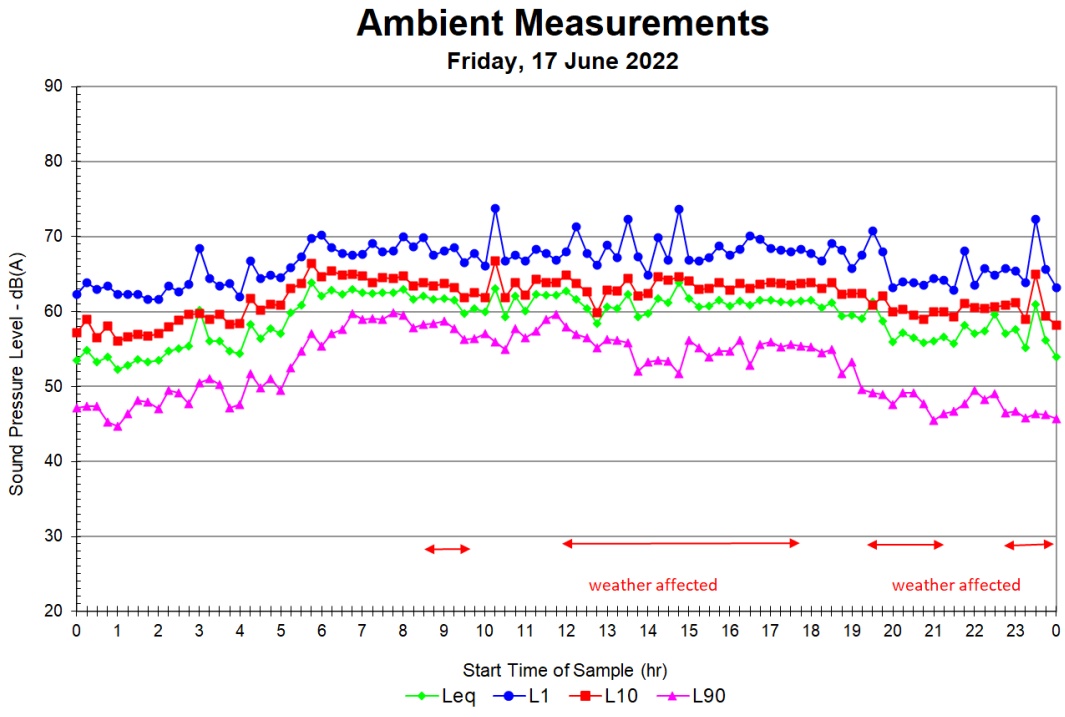
Day	Leq Ambient Noise Levels		Leq 1 Hr Noise Levels			
	Day 7am - 10pm	Night 10pm - 7am	Day - Max	Day - Min	Night - Max	Night - Min
Thursday 16 June 2022	*	60.9	*	*	65.0	55.5
Friday 17 June 2022	63.4	59.2	65.0	58.9	62.4	54.5
Saturday 18 June 2022	61.7	57.0	63.4	57.4	59.9	54.3
Sunday 19 June 2022	61.4	60.2	63.5	60.0	65.5	55.4
Monday 20 June 2022	63.7	61.9	66.1	60.6	66.5	55.0
Tuesday 21 June 2022	64.5	60.4	68.6	60.7	64.7	54.2
Wednesday 22 June 2022	63.7	61.6	65.7	60.5	66.3	55.4
Thursday 23 June 2022	63.7	60.9	66.0	59.8	65.4	56.3
Friday 24 June 2022	64.5	59.4	68.4	60.6	62.3	54.3
Saturday 25 June 2022	62.7	58.9	64.9	60.3	61.1	54.4
Sunday 26 June 2022	62.0	60.1	*	60.4	64.3	53.9
Monday 27 June 2022	53.3	2.5	64.2	*	*	*
Log Average	**62.9**	**59.8**	**65.9**	**60.0**	**64.4**	**54.9**

* indicates an incomplete set of data for a given time period
# Nighttime for a given day continues through to the following morning



2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

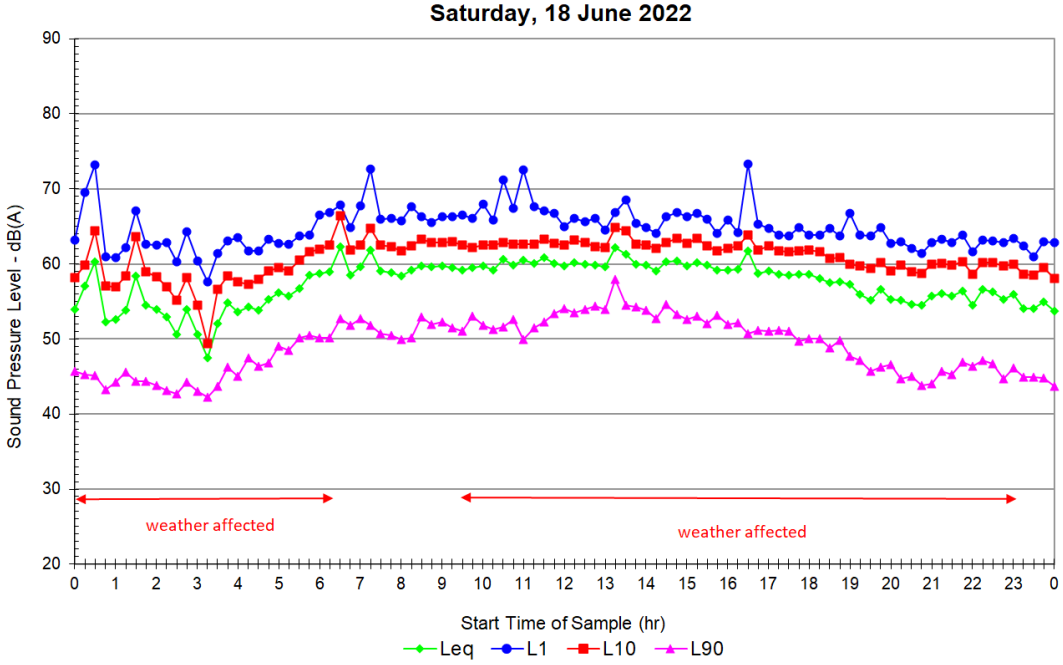


2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

Ambient Measurements

Saturday, 18 June 2022

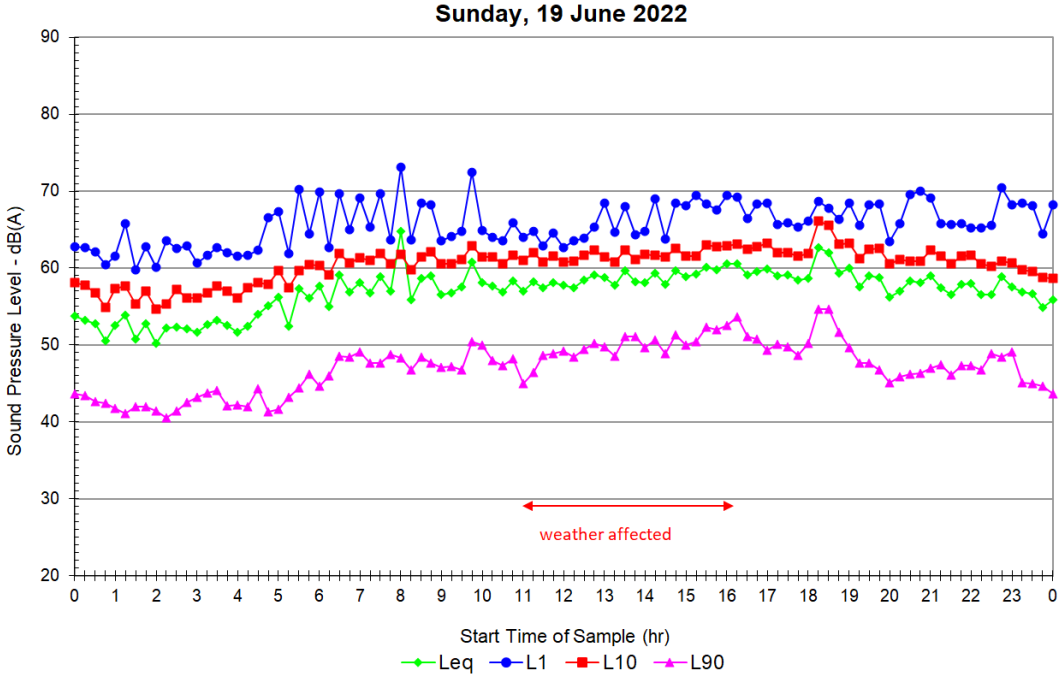


2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

Ambient Measurements

Sunday, 19 June 2022

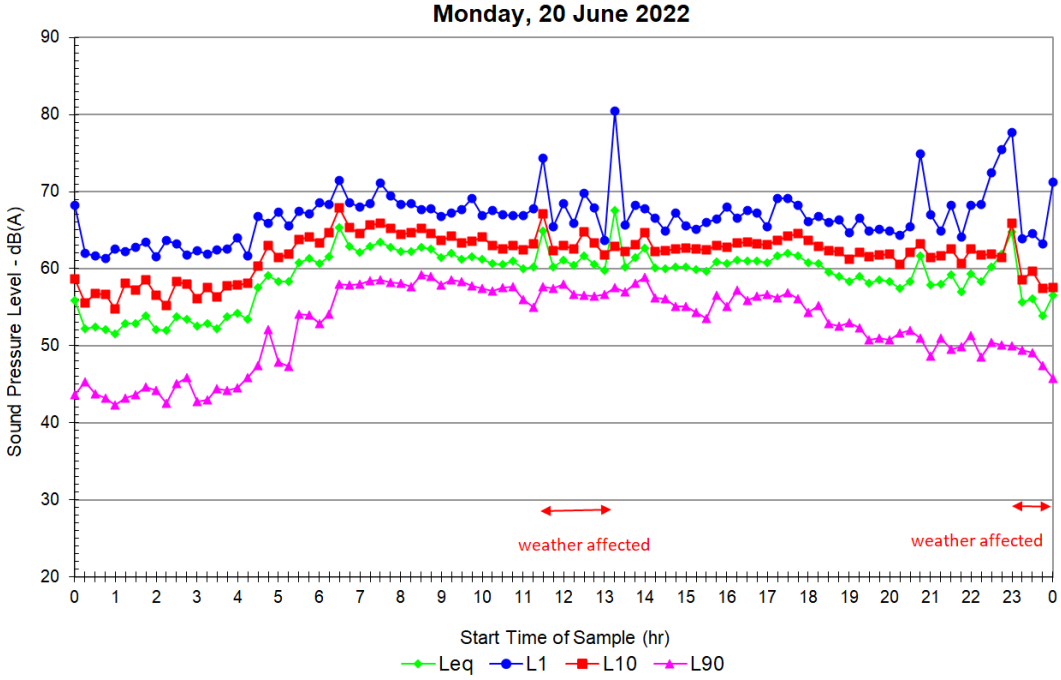


2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

Ambient Measurements

Monday, 20 June 2022

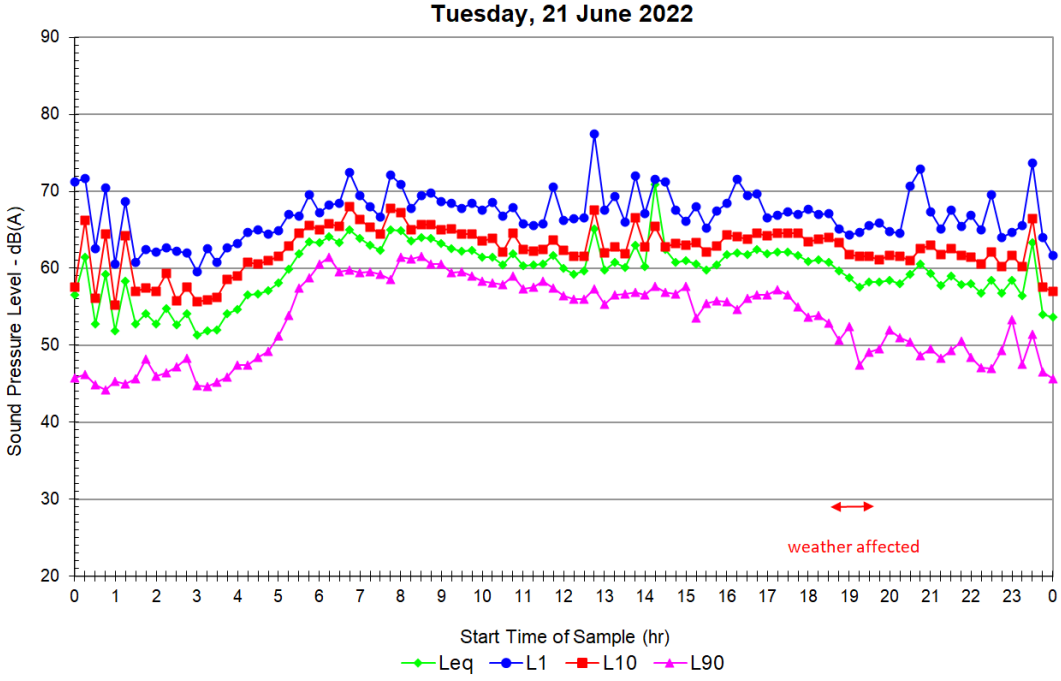


2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

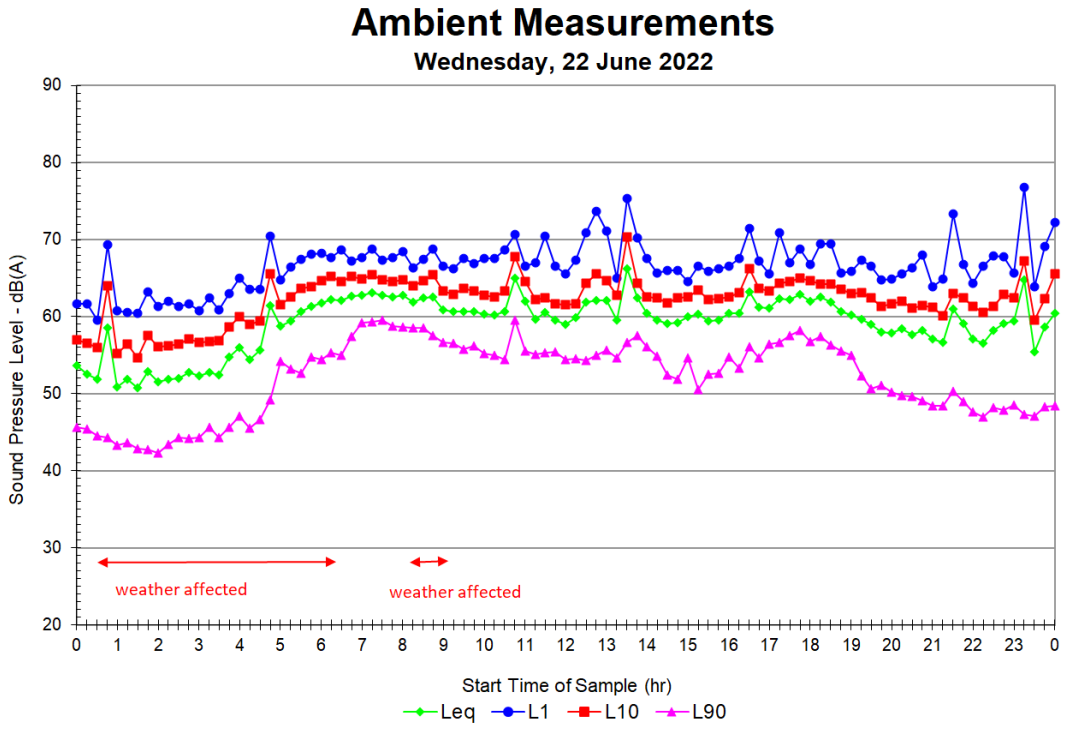
Ambient Measurements

Tuesday, 21 June 2022



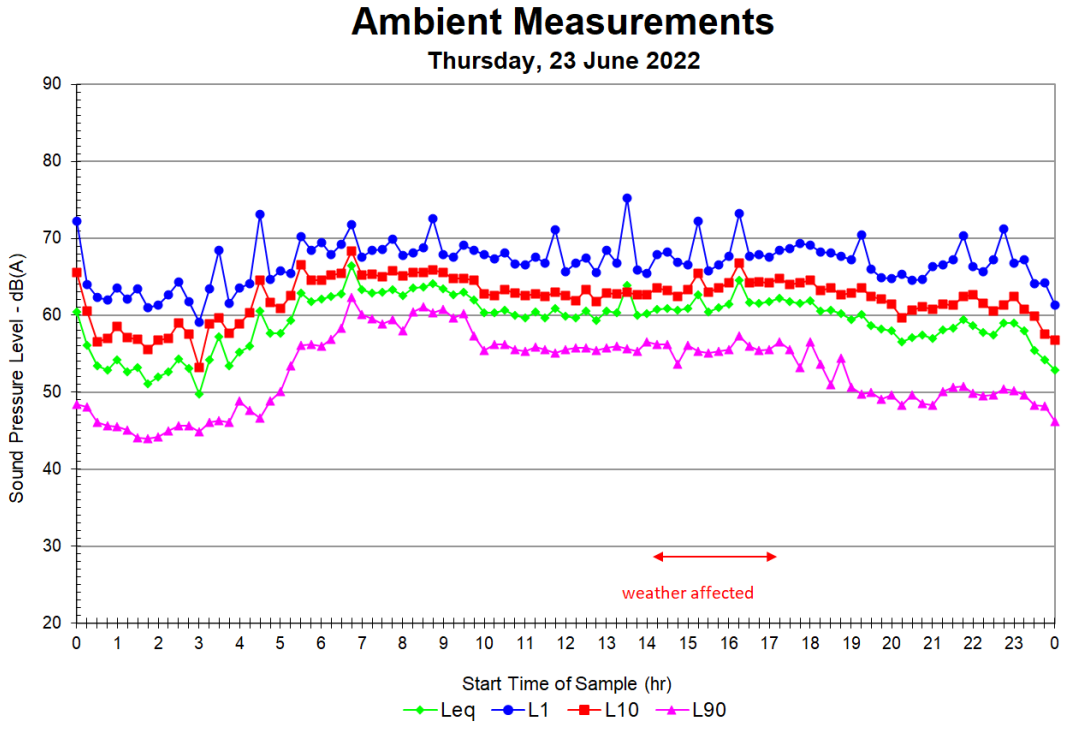
2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)



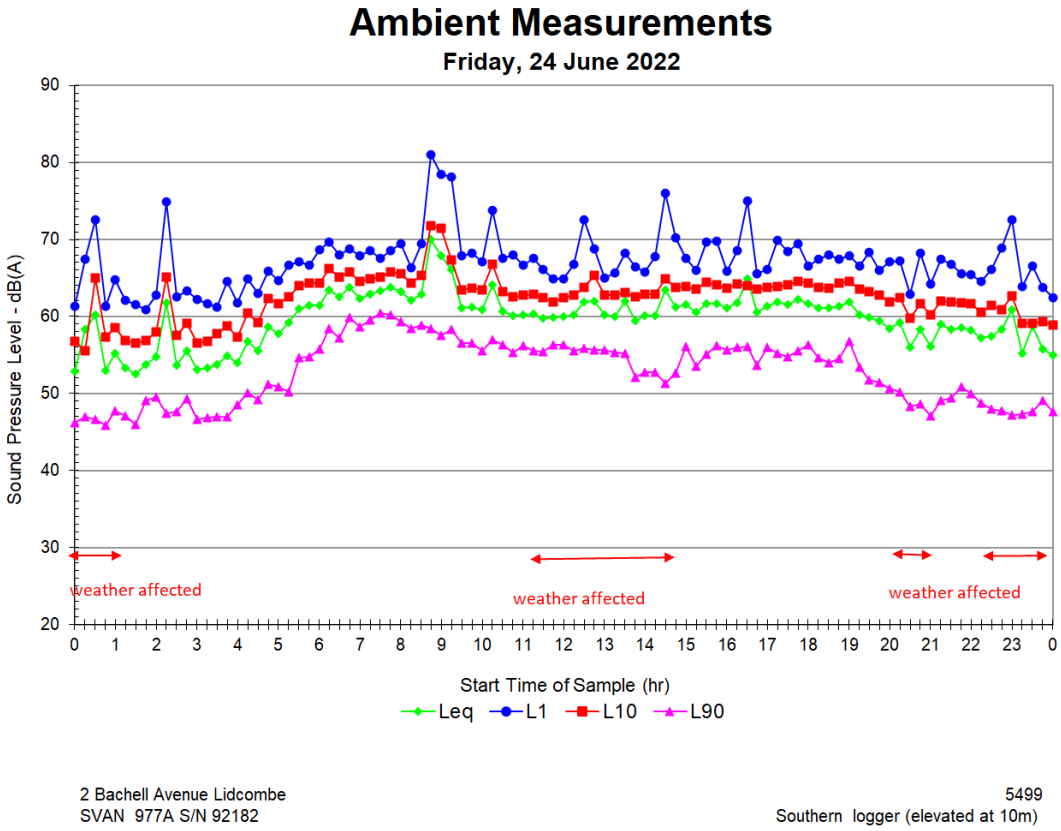
2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

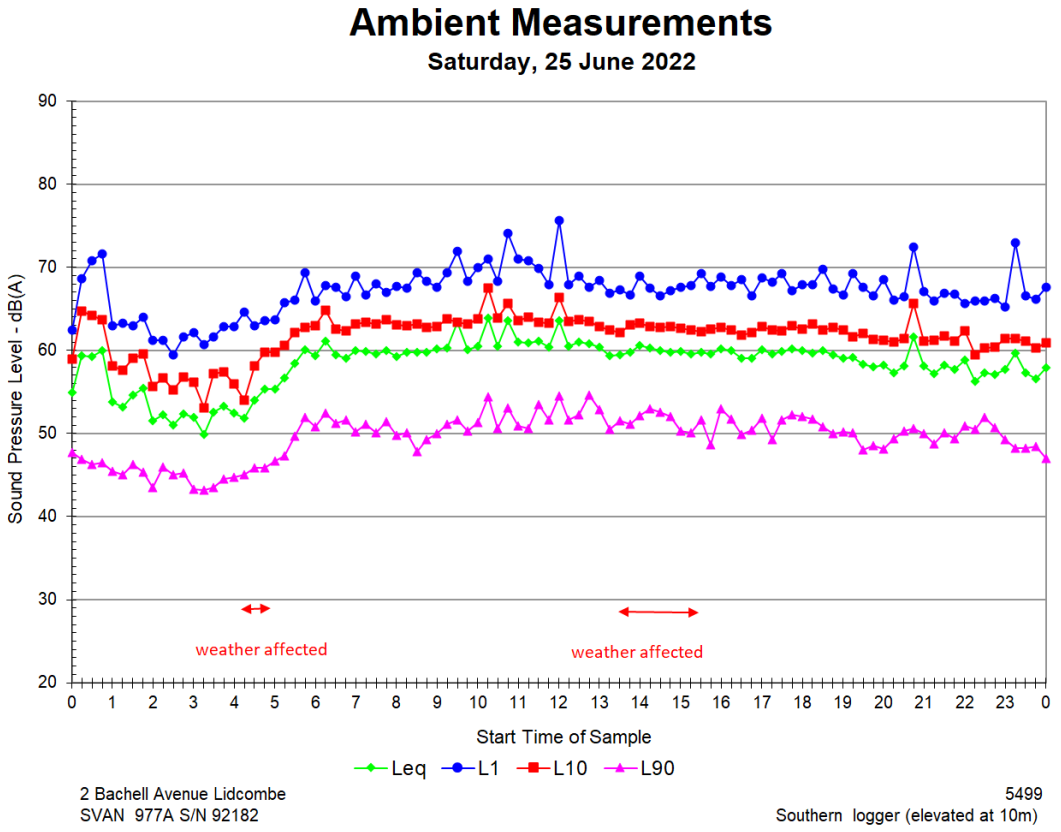
5499
Southern logger (elevated at 10m)



2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

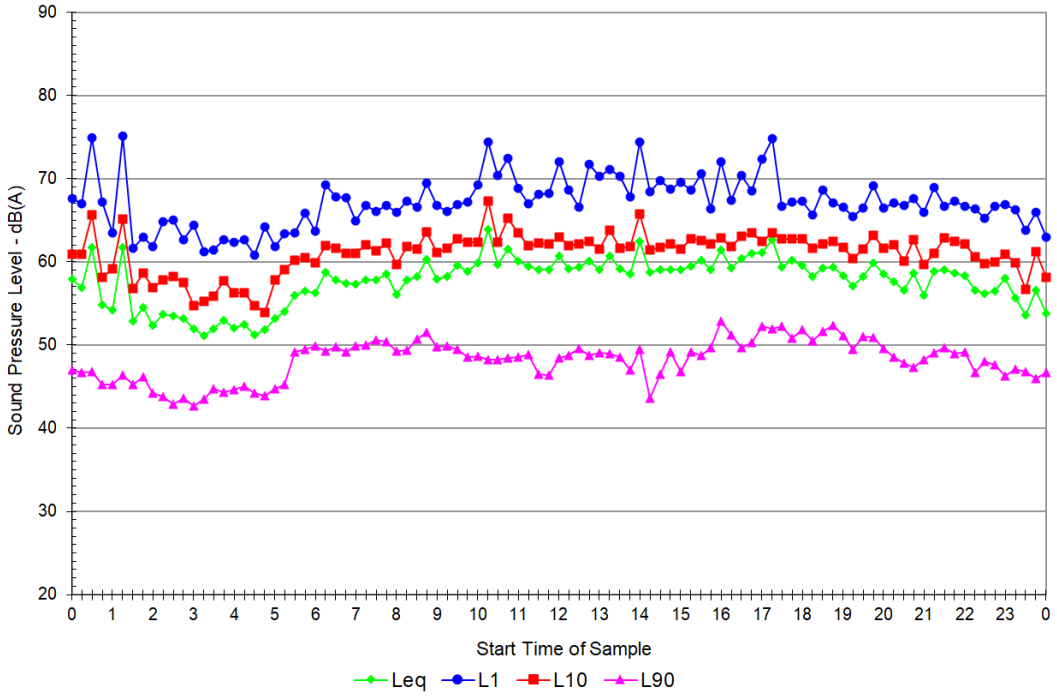
5499
Southern logger (elevated at 10m)





Ambient Measurements

Sunday, 26 June 2022

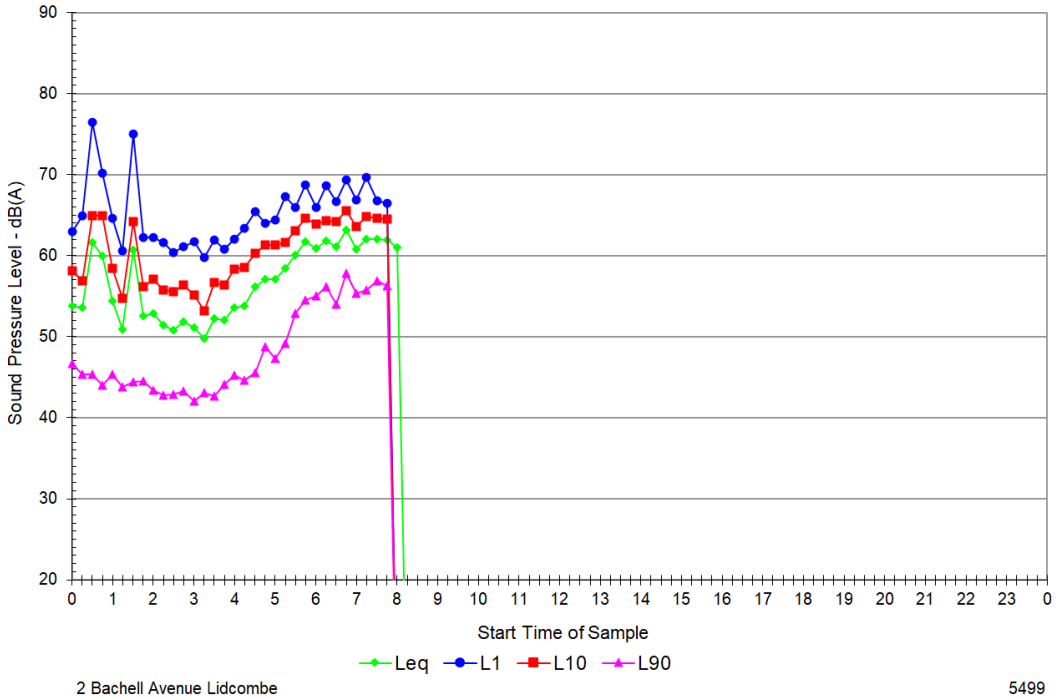


2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

Ambient Measurements

Monday, 27 June 2022



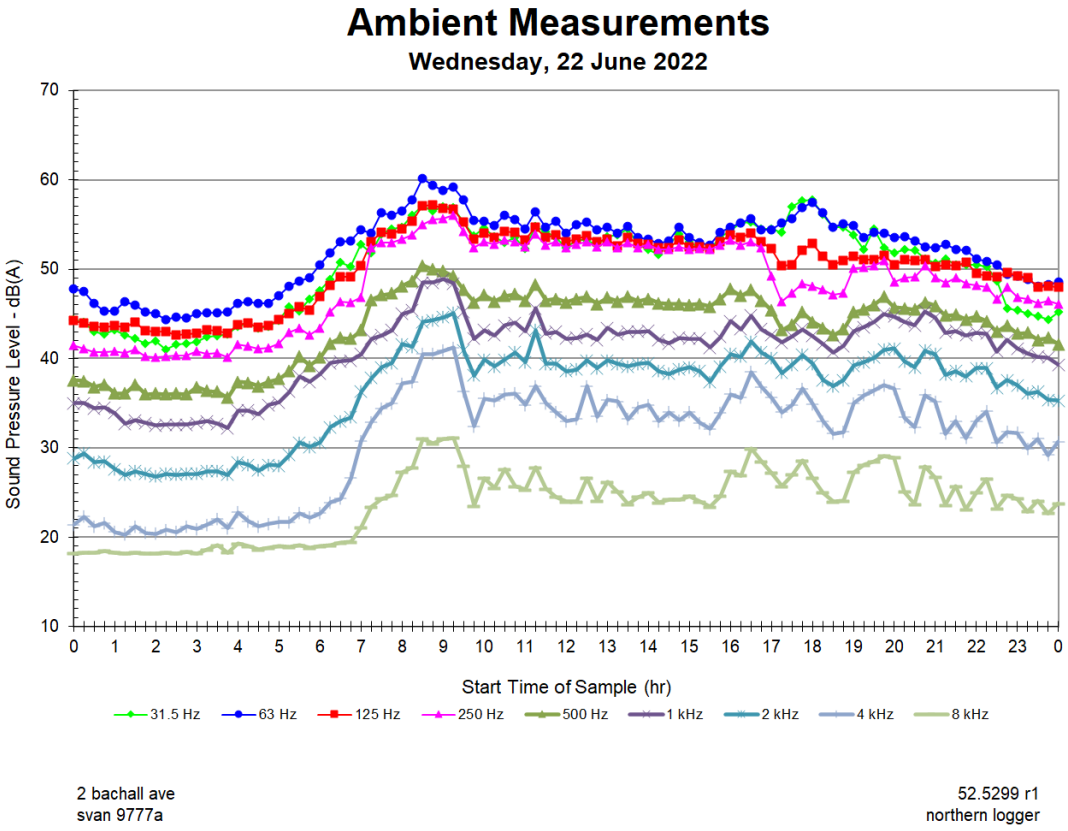
2 Bachell Avenue Lidcombe
SVAN 977A S/N 92182

5499
Southern logger (elevated at 10m)

APPENDIX E: Octave Band Logger L90 Background Results

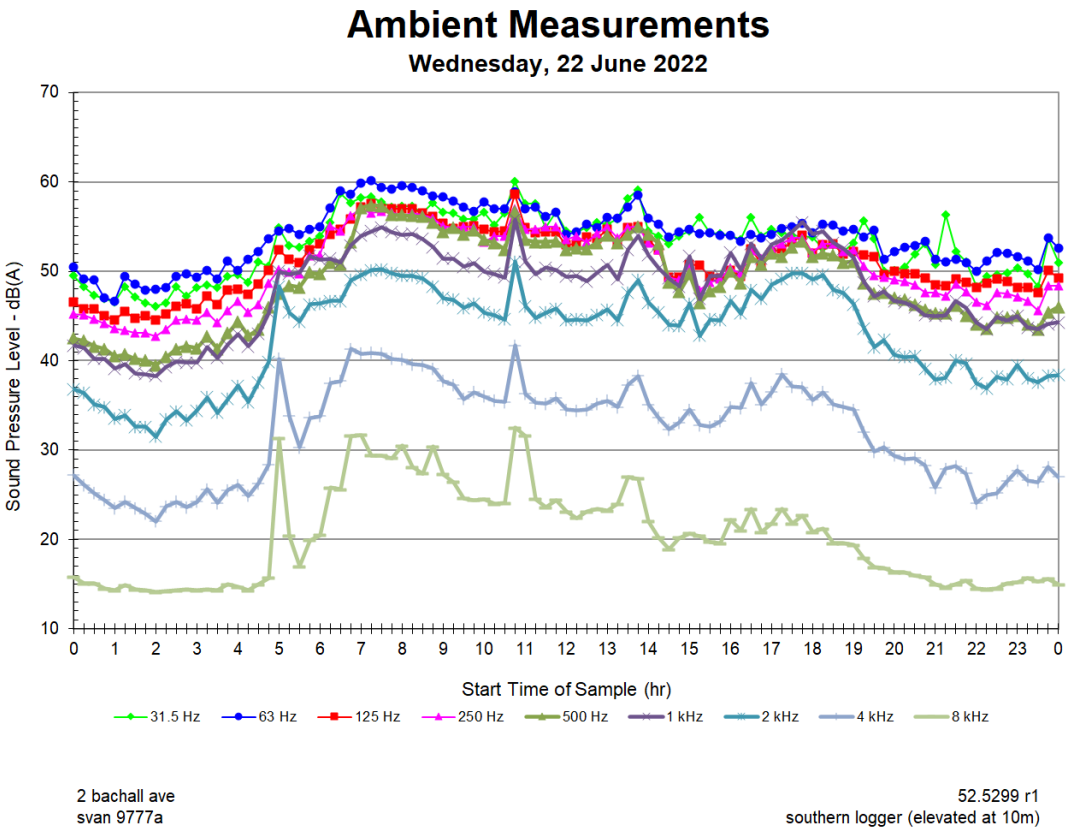
Northern Logger

Time Period	dB(A)	Linear Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
RBL day	45	53	52	46	43	43	41	36	26	15
RBL evening	42	48	48	44	40	40	39	32	18	11
RBL night	40	47	47	41	38	38	35	27	15	11
RBL 7am – midnight	43	49	48	44	40	40	40	32	18	11
RBL midnight to 7am	39	47	46	41	37	37	35	27	15	11

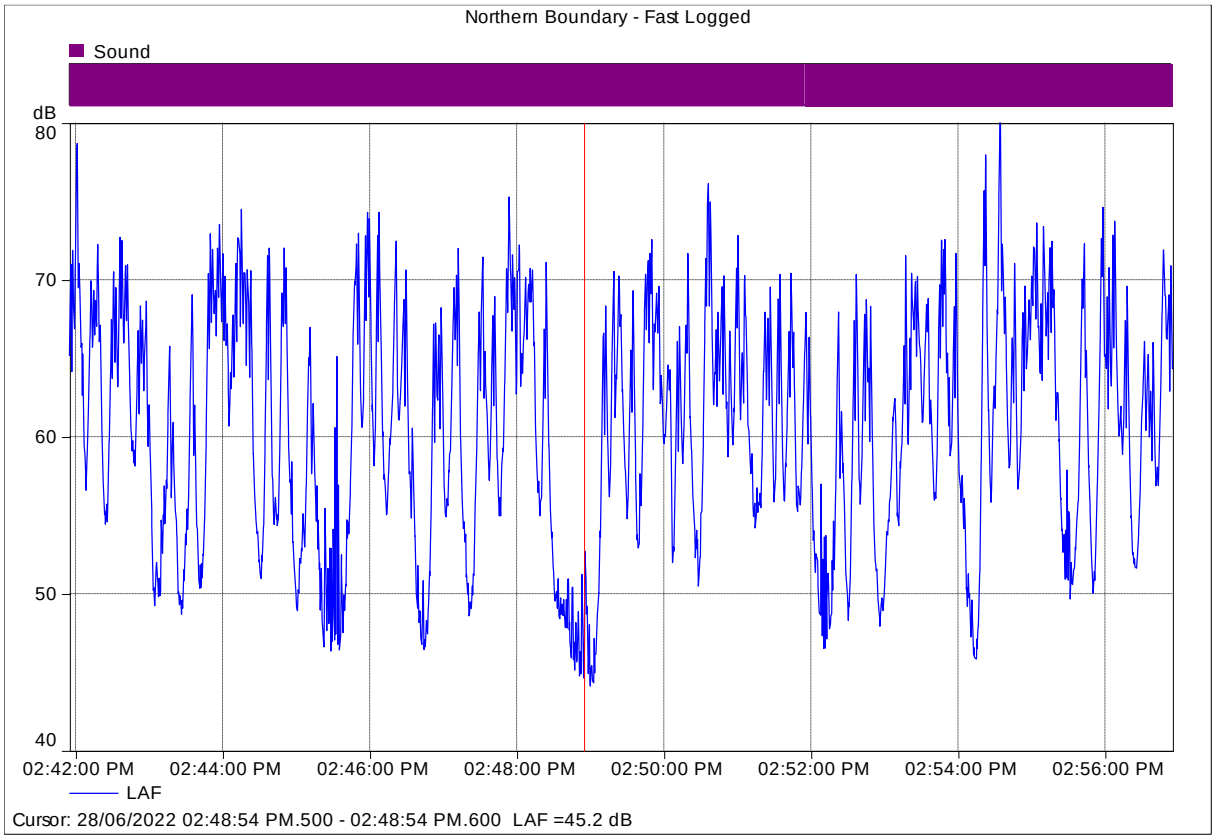


Southern Logger

Time Period	dB(A)	Linear Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
RBL day	53	54	54	50	50	49	49	48	33	20
RBL evening	48	49	52	49	47	45	44	38	26	15
RBL night	44	47	49	46	44	41	40	33	23	14
RBL 7am – midnight	49	50	52	59	47	45	45	38	27	15
RBL midnight to 7am	43	47	49	46	44	41	39	33	23	14

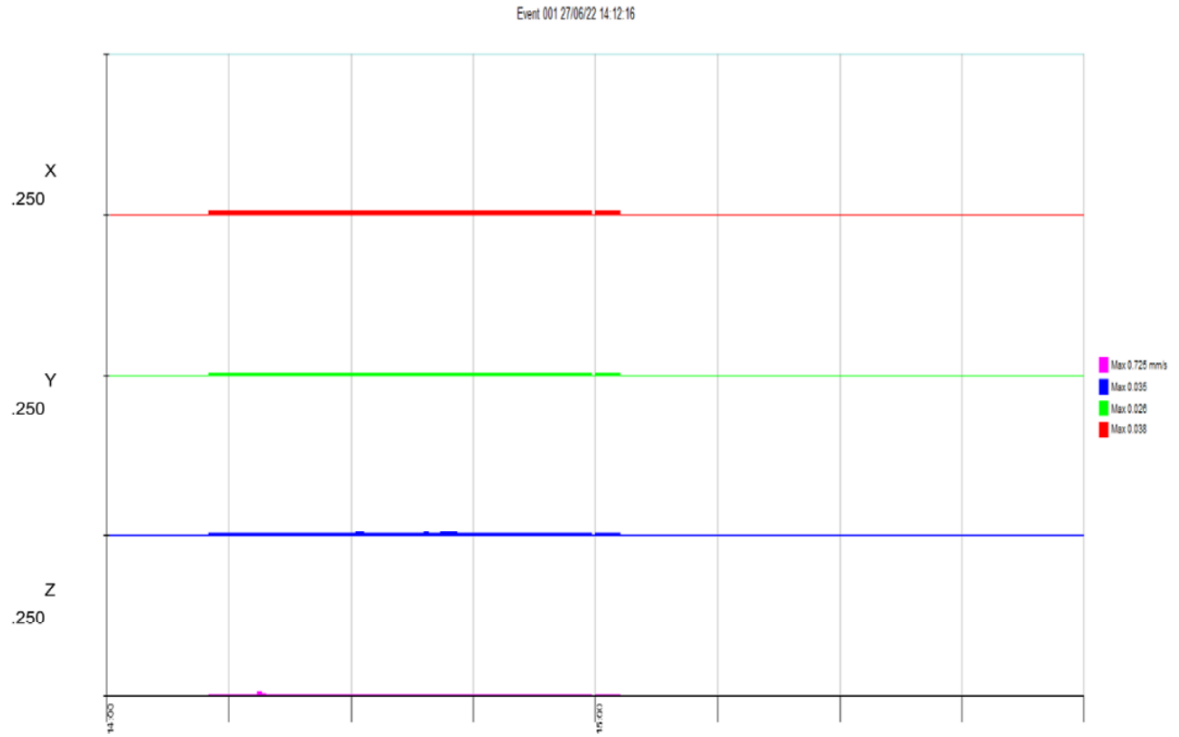


APPENDIX F: Attended Measurement Results



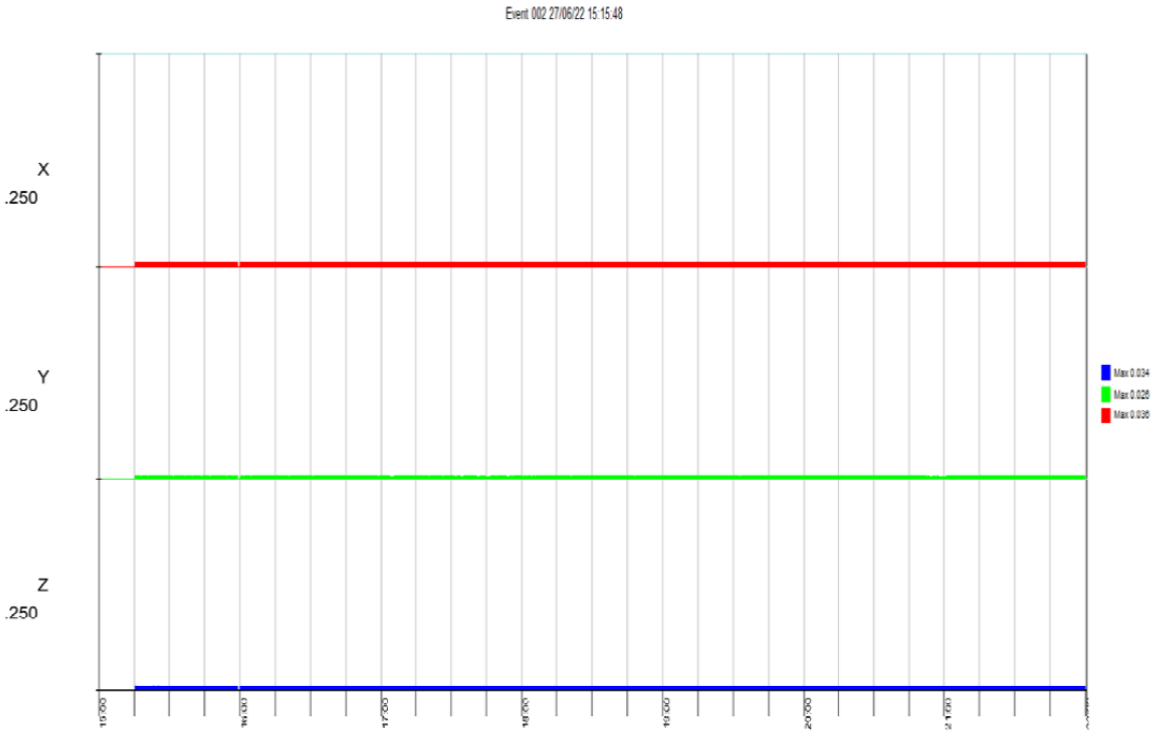
Location	Parameter	dB(A)	A-weighted Octave Band Centre Frequency (Hz)								
			31	63	125	250	500	1k	2k	4k	8k
Tuesday 28 June 2022											
Northern site boundary near Northern logger	Ambient L_{10}	70	32	44	50	56	61	67	64	53	42
	Ambient L_{eq}	65	29	44	47	52	57	63	59	50	41
	Ambient L_{90}	50	19	32	35	39	41	46	43	35	21

APPENDIX G: Vibration Logger Results

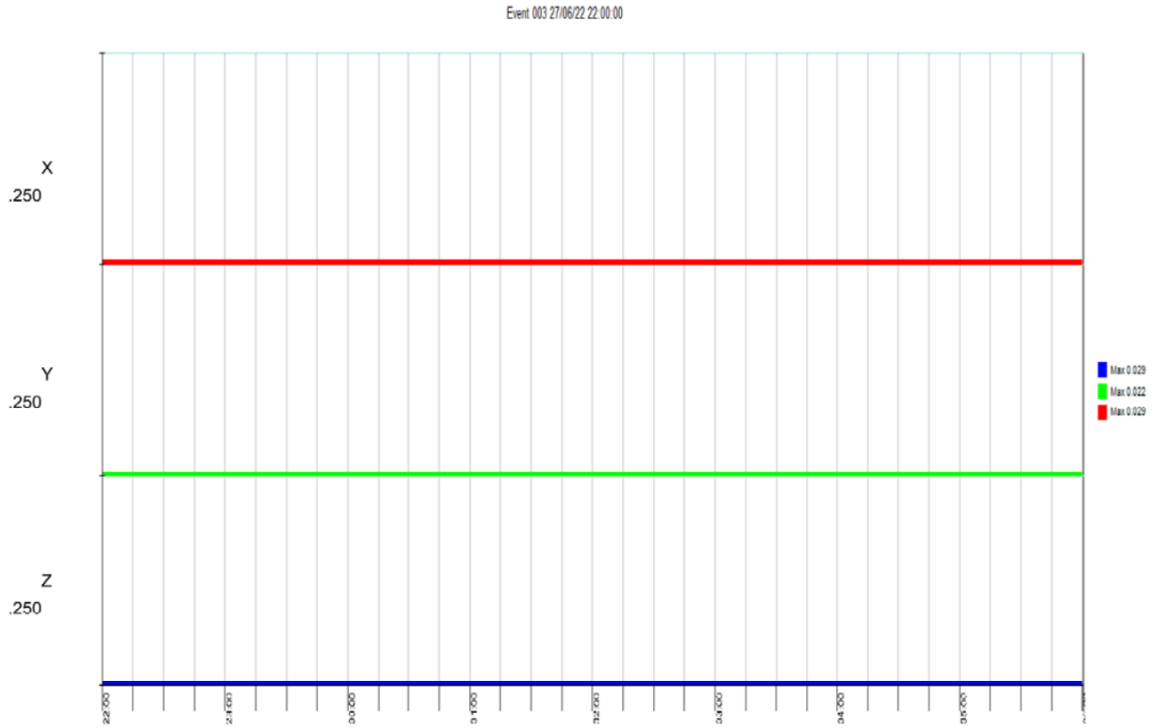


Ev 001 VDV	X	Y	Z	X	Y	Z
		16 Hour				
	.038	.026	.035			
		1 Hour			Total	
Hour 1	.018	.013	.017	.017	.012	.016
Hour 2	.019	.013	.017	.018	.012	.017

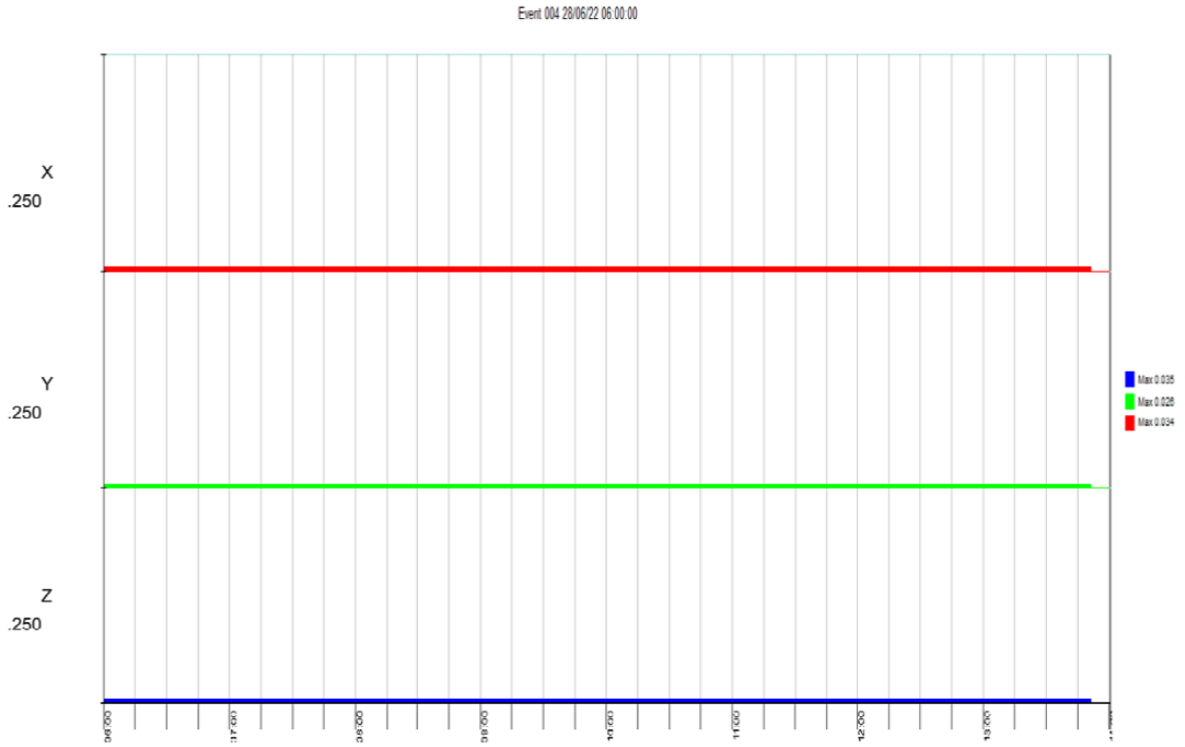
Ev 001 Cont	Max	Bank B Time	Date
Event	.725mm/s	14:12:26	27/06/22
Hour 1	.300mm/s	14:18:56	27/06/22
Hour 2	.150mm/s	15:00:46	27/06/22



Event 002	X	Y	Z	X	Y	Z
		16 Hour				
	.036	.026	.034			
		1 Hour			Total	
Hour 1	.018	.013	.019	.017	.012	.017
Hour 2	.018	.013	.018	.021	.015	.021
Hour 3	.018	.013	.015	.024	.017	.023
Hour 4	.018	.013	.016	.026	.018	.024
Hour 5	.018	.013	.017	.027	.019	.025
Hour 6	.017	.013	.017	.028	.020	.027
Hour 7	.017	.013	.017	.029	.021	.028

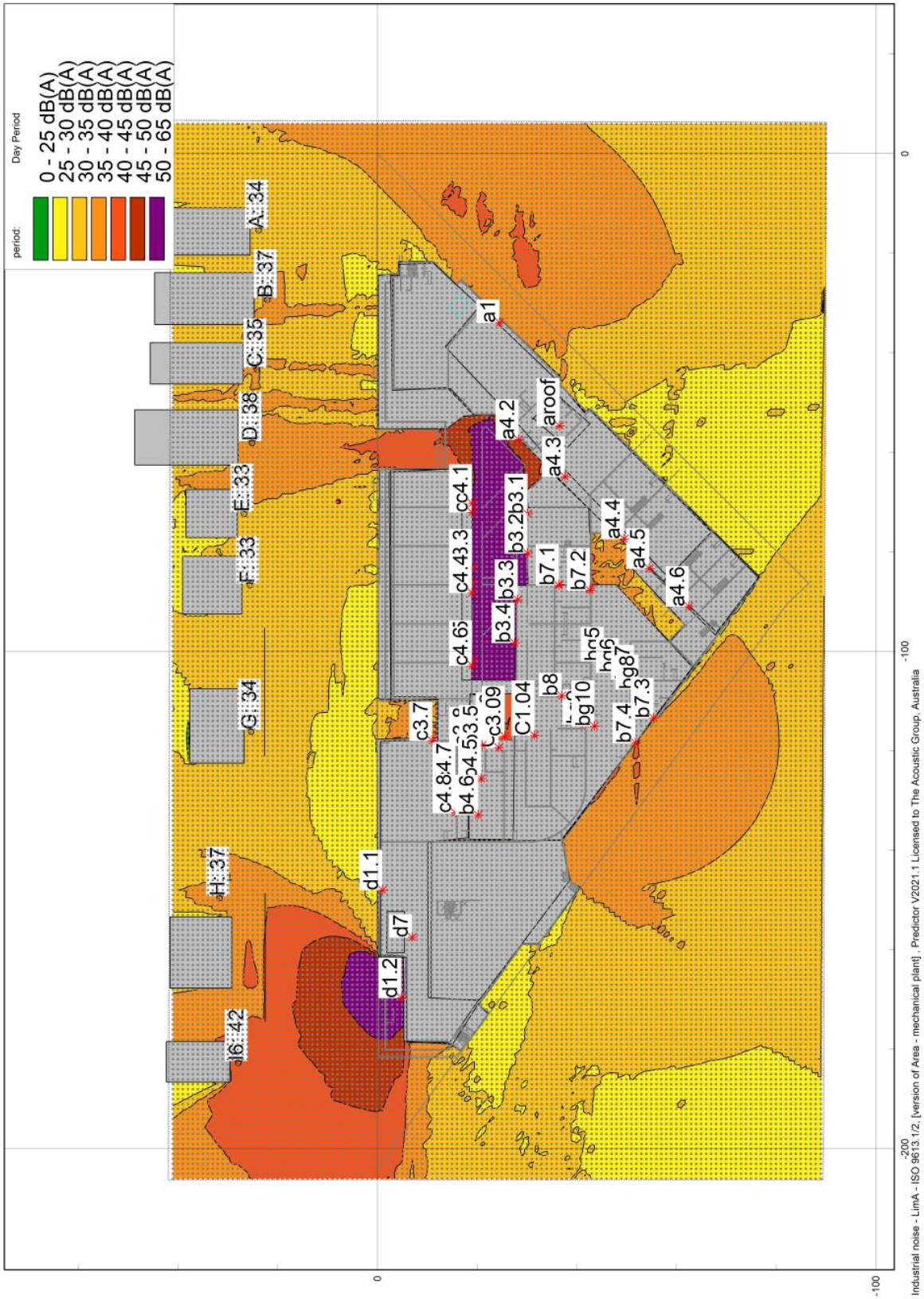


Event 003	X	Y	Z	X	Y	Z
		8 Hour				
	.029	.022	.029			
		1 Hour			Total	
Hour 1	.018	.013	.017	.018	.013	.017
Hour 2	.017	.013	.017	.021	.015	.020
Hour 3	.017	.013	.017	.023	.017	.022
Hour 4	.017	.013	.017	.025	.018	.024
Hour 5	.017	.013	.017	.026	.020	.025
Hour 6	.017	.013	.017	.027	.021	.027
Hour 7	.017	.013	.017	.028	.021	.028
Hour 8	.017	.013	.017	.029	.022	.029

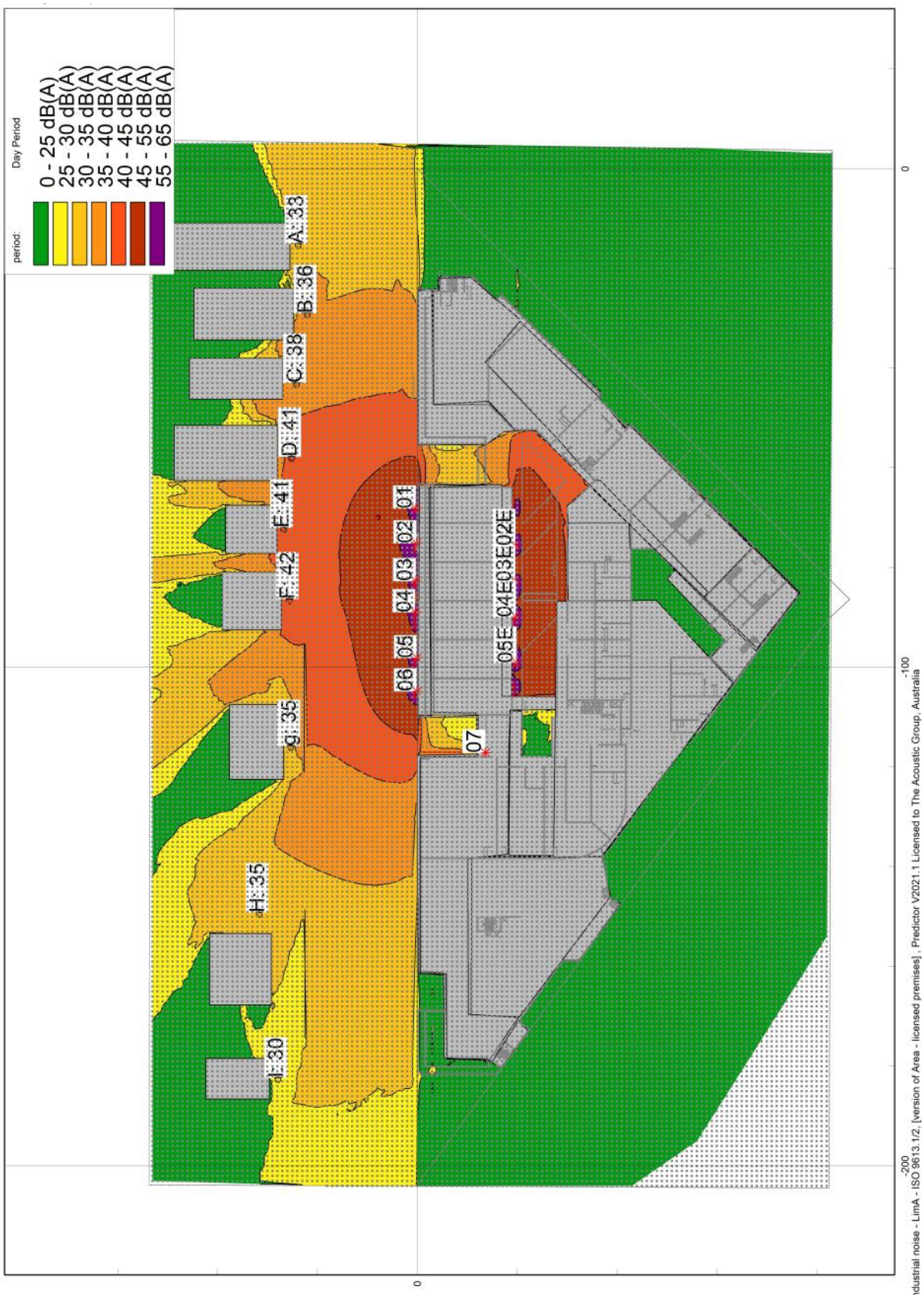


Event 004	X	Y	Z	X	Y	Z
		16 Hour				
	.034	.026	.035			
		1 Hour			Total	
Hour 1	.017	.013	.017	.017	.013	.017
Hour 2	.017	.013	.018	.020	.016	.021
Hour 3	.017	.013	.018	.022	.017	.023
Hour 4	.017	.013	.017	.024	.019	.025
Hour 5	.017	.013	.017	.025	.020	.026
Hour 6	.017	.013	.017	.026	.021	.027
Hour 7	.017	.013	.017	.027	.021	.028
Hour 8	.017	.013	.016	.028	.022	.029

APPENDIX H: Preliminary Noise Modeling

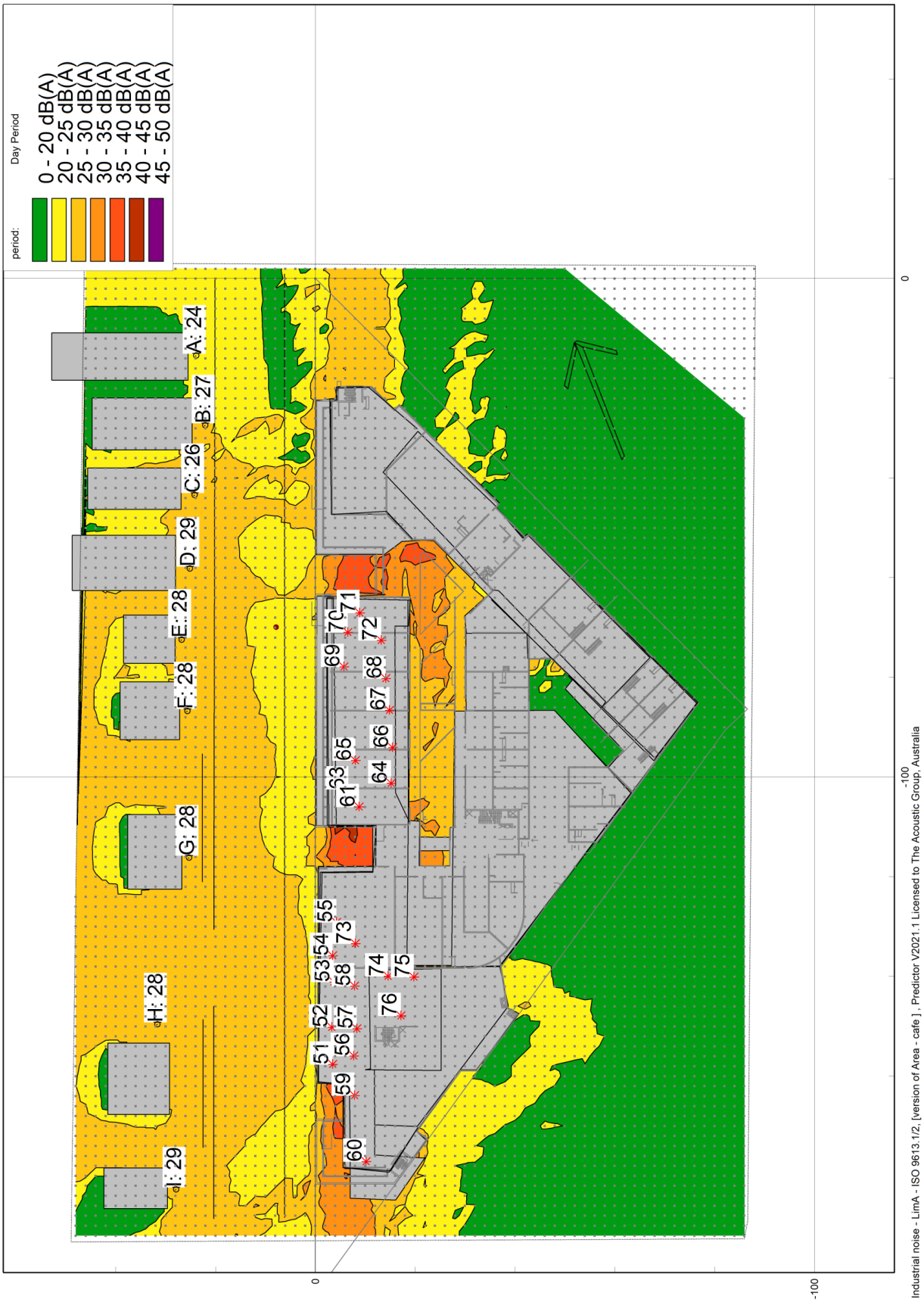


Mechanical Plant

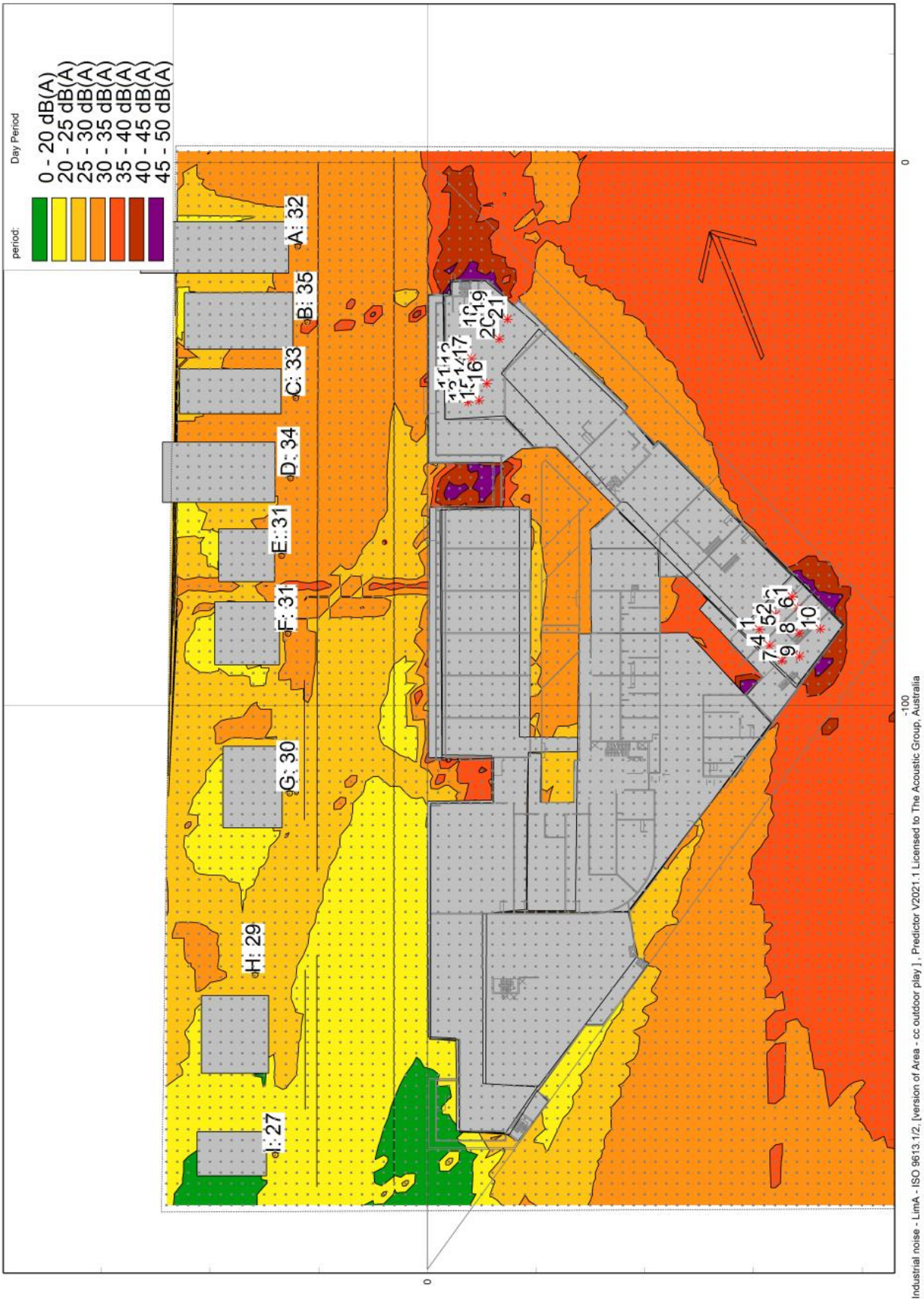


Scenario 1 Licensed Premises – using western terraces

Scenario 2 Licensed Premises no terraces – western doors closed



Level 5 Terrace and Level 7 Half Basketball Court



Child Care Centre – outdoor play – all active