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# *Acoustic Report*

## *– Traffic Noise Assessment-*

## *- Environmental Impact Assessment-*

## For the proposed Development

## at

# No. 691-695 Victoria Road, Ryde

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## 1.0 SCOPE OF WORK & SITE DESCRIPTION

The aim of this report is to determine the building materials to be used and the construction methods to be adopted such that the proposed development at No. 691-695 Victoria Road, Ryde is built to achieve acceptable internal noise levels as per Ryde Council requirements.

Noise intrusion levels (Noise Break-in) from the surrounding environment are to be within the limits adopted by AS 2107:2016 *'Acoustics – Recommended Design Sound Levels and Reverberation Times'* and section 2.120 of the SEPP (Ttransport & Infracstructure) 2021 [formally known as Clause 102 of the State Environmental Planning Policy – (Infrastructure) 2007], such that all habitable rooms in the proposed development shall be designed to limit internal noise levels.

The Floors & Walls of the proposed development are also to comply with Part F5 of the NCC 2019/ F7 NCC 2022.

Noise breakout from the use of the proposed building, including all proposed mechanical plants and equipment is to comply with the NSW Noise Policy for Industry (2017) and Ryde City Council requirements.

The site is located on the corner of Blaxland Rd and Victoria Rd in the suburb of Ryde (Figure 1 – Site Location) within a mixed residential and commercial environment (Figure 2 – Surrounding Environment).

The architectural plans by CD Architects dated May, 2025 are for the proposed construction of three blocks of mixed-use building development, including three (3) levels of basement parking and one (1) level of visitor parking on the ground floor. A childcare centre is located on the ground floor while residential apartments are located on all the floors above.

The nearest receivers that have the potential to be affected by the proposed development are the buildings located as follows: (Figure 3 – Nearest Affected Receivers)

**Table 1.1 – Nearest Residential Receivers**

| Receiver | Address & Location | Dwelling Type |
|---|---|---|
| R1 | No. 2 Hatton St, Ryde (west of site) | Residential Units |
| R2 | No. 4 Hatton St, Ryde (west of site) | Residential Units |
| R3 | No. 6 Hatton St, Ryde (west of site) | Residential Units |
| R4 | No. 8 Hatton St, Ryde (west of site) | Residential Units |
| R5 | No. 20 Blaxland Rd, Ryde (north-west of site) | Residential Units |

## 2.0 ACOUSTIC DESCRIPTORS

**$L_{Amax}$ –** The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

**$L_{A1}$ –** The $L_{A1}$ level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the $L_{A1}$ level for 99% of the time.

**$L_{A10}$ –** The $L_{A10}$ level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the $L_{A10}$ level for 90% of the time. The $L_{A10}$ is a common noise descriptor for environmental noise and road traffic noise.

**$L_{Aeq}$ –** The equivalent continuous sound level ($L_{Aeq}$) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

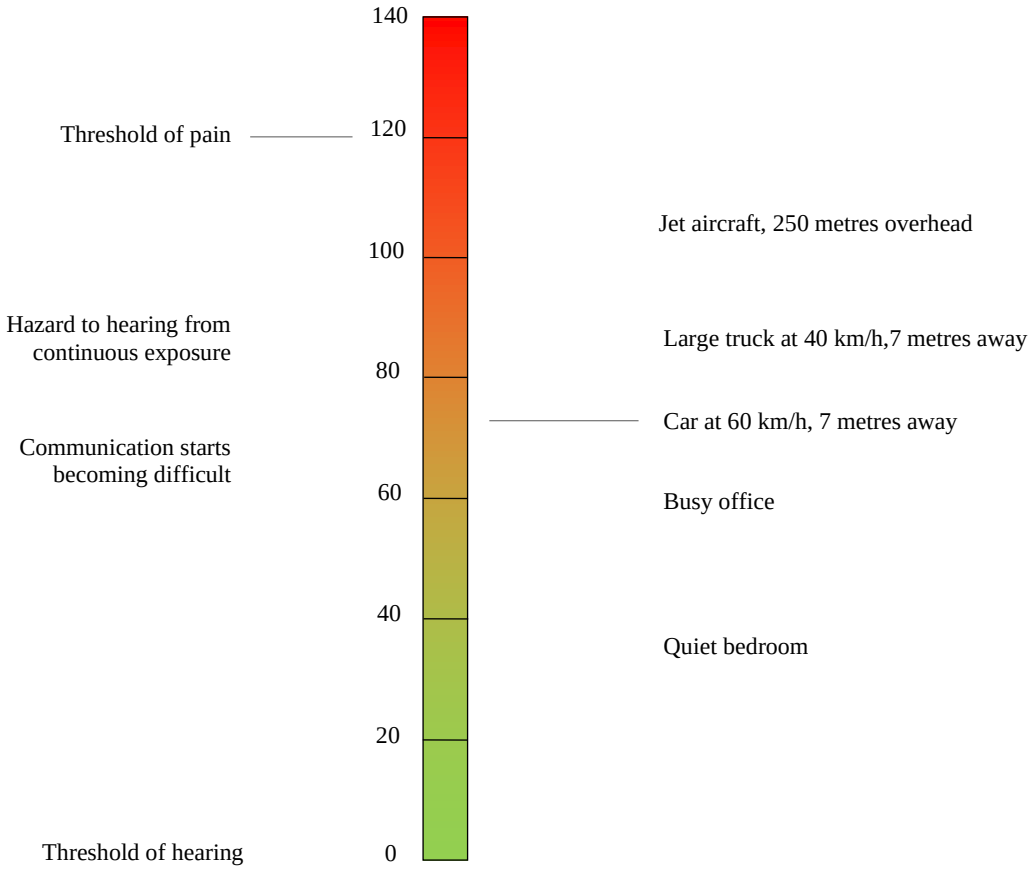
**$L_{A50}$ –** The $L_{A50}$ level is the noise level which is exceeded for 50% of the sample period. During the sample period, the noise level is below the $L_{A50}$ level for 50% of the time.

**$L_{A90}$ –** The $L_{A90}$ level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the $L_{A90}$ level for 10% of the time. This measure is commonly referred to as the background noise level.

**ABL –** The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and nighttime) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level ($L_{A90}$) for each period.

**RBL –** The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and nighttime.

The level of common sounds on the dB(A) scale as the figure below:


140
120
100
80
60
40
20
0
Threshold of pain
Hazard to hearing from continuous exposure
Communication starts becoming difficult
Threshold of hearing
Jet aircraft, 250 metres overhead
Large truck at 40 km/h,7 metres away
Car at 60 km/h, 7 metres away
Busy office
Quiet bedroom

## 3.0 NOISE SURVEY, INSTRUMENTATION & RESULTS

On October 24th, 2023, an engineer from this office went to the above address and carried out noise measurements at the proposed development. Unattended noise measurements were carried out near the proposed building line - Point A - in direct line of sight of Victoria Road in order to determine traffic noise levels. Background noise readings were also carried out (away from the main road) near the northern boundary of the site- Point B- in order to determine existing background noise levels (Figure 4 – Noise Reading Locations – Point A and Point B).

The unattended noise measurements at points A & B were carried out for a period of seven (7) days between the 24th of October 2023 and the 30th of October 2023. The noise survey was conducted to determine the $L_{(A90,\ 15\ minutes)}$ and $L_{(Aeq,\ 15\ minutes)}$ of the existing *background noise levels* during the Day (7:00-18:00), Evening (18:00-22:00) and Night (22:00-7:00).

All unattended sound level measurements and analysis performed throughout this project are carried out with a NSRTW_MK3 wireless sound level data logger (Serial No. Alv8DHWQUXU3grtCZwJZPD- Office Tag- machine 4 & logger (Serial No. CPp0Dd04c1c9iLtiSwBRPD- Office tag -machine 1-). The sound loggers specifications are as follows:

- Type 1 digital MEMS microphone
- Non-volatile 128 Mb recording memory
- Records L-max, L-min and Leq levels
- Log interval adjustable from 125 ms (8 points per second) up to hours
- A, C and Z weighting curves
- Oscilloscope and spectrum analyser features
- Observes and records 100% of the acoustic signal
- Software calculates global Leq according to ISO and OSHA methods
- WIFI connectivity to report measured levels remotely
- Weatherproof casing designed for indoor/outdoor applications
- Activity detection and logging.
- Long-term measurement and recording of acoustic levels for environmental impact studies.

The loggers are factory calibrated and calibration certificates dated 05/07/2022 and 14/08/2023 are presented in Figure 5 – Calibration Certificates.

The microphones were positioned 1.5m from ground level. The machines were calibrated prior and after reading using our Svantek SV 33A S/N: 90200 class 1 Calibrator with No significant drift recorded. Any noise readings affected by strong wind or rain have been disregarded [1]. A Summary of those readings are presented in the tables below:

*Table 3.1 – Summary of Unattended Noise Measurements at Point A* – October 24th, 2023 – October 30th, 2023-*

| *Location* | *Time of Day* | *Leq 15 Minute dB(A)* | *L90 15 Minute dB(A)* | *RBL ** |
|---|---|---|---|---|
| **Point A – Southern Boundary of Site ( Traffic Noise)** | Day 7:00-18:00 | 69 | 57 | 55 |
| | Evening 18:00-22:00 | 67 | 56 | 54 |
| | Night 22:00-7:00 | 63 | 49 | 42 |

***Site is mainly affected by traffic noise from Victoria Rd**
****RBL is calculated as per Fact Sheet B of the NPfI (2017)**

*Table 3.2- Day & Night Noise Readings at Point A - October 24th, 2023 – October 30th, 2023*

| *Location* | *$L_{Aeq,\ 15\ hr}$ -Day- dB(A) Logarithmic Average* | *$L_{Aeq,\ 9hr}$ -Night- dB(A) Logarithmic Average* |
|---|---|---|
| **Point A** | 68 dB(A) | 63 dB(A) |

*Table 3.3 - Summary of Unattended Background Noise Readings at Point B- October 24th, 2023 – October 30th, 2023**

| *Measurement Location* | *Time Period* | *LAeq 15min dB(A)* | *LA90 15min dB(A)* | *Rating Background Level (RBL)** dB(A)* |
|---|---|---|---|---|
| **Point B** | ***Day (7am-6pm)*** | 55 | 46 | 44 |
| | ***Evening (6pm-10pm)*** | 51 | 44 | 41 |
| | ***Night (10pm-7am)*** | 50 | 44 | 40 |

***RBL is calculated as per Fact Sheet B of the NPfI (2017)**

Note [1]: Noise data is validated using the weather zone websites addresses:
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-24
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-25
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-26
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-27
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-28
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-29
https://www.weatherzone.com.au/station/SITE/66212/observations/2023-10-30

The Full Average Statistical Noise Parameters L(Aeq, 15 minutes), L(A90, 15 minutes), L(A10, 15 minutes), L(A1, 15 minutes) at Point A & B are presented in Figures 6 & 7 – Noise Survey Points A & B.

## 4.0 TRAFFIC NOISE ASSESSMENT – *NOISE BREAK IN* –

Noise break-in into the proposed development will mainly be from traffic on Parramatta Rd with internal noise levels inside the development to comply with AS 2107:2016, Department of Planning's document titled "*Development Near Rail Corridors and Busy Roads – Interim Guidelines"* [ Referred to as the Interim Guidelines in this report] and Clause 102 of the SEPP (Referred to now as Section 2.12 of SEPP (Transport & Infrastructure) 2021 .

### 4.1 AUSTRALIAN STANDARD 2107:2106 , THE INTERIM GUIDELINES & CLAUSE 102 OF THE STATE ENVIRONMENTAL PLANNING POLICY (SEPP)

It is usual practice, when we find it necessary to recommend internal sound levels in buildings to refer to Australian/New Zealand Standard AS/NZS 2107:2016 "Acoustics – Recommended Design Sound Levels and Reverberations times for Building Interiors".

AS/NZS 2107:2016 sets out design internal noise levels and reverberation times for different buildings depending on the use of these structures. The noise levels recommended in AS/NZS 2107:2016 take into account the function of the area and apply that to the sound level measured within the space unoccupied although ready for occupancy.

In Table 1, Page 13, the standard recommends the following noise levels for residential buildings.

| Type of occupancy/activity | Design sound level ($L_{Aeq,t}$) range | Design reverberation time ($T$) range, $s$ |
|---|---|---|
| RESIDENTIAL BUILDINGS (see Note 5 and Clause 5.2) | | |
| Houses and apartments in inner city areas or entertainment districts or near major roads— | | |
| Apartment common areas (e.g. foyer, lift lobby) | 45 to 50 | — |
| Living areas | 35 to 45 | — |
| Sleeping areas (night time) | 35 to 40 | — |
| Work areas | 35 to 45 | — |
| Houses and apartments in suburban areas or near minor roads— | | |
| Apartment common areas (e.g. foyer, lift lobby) | 45 to 50 | — |
| Living areas | 30 to 40 | |
| Sleeping areas (night time) | 30 to 35 | |
| Work areas | 35 to 40 | — |

### 4.2 Section 2.120 OF THE SEPP (Transport and Infrastructure ) 2021-Internal Noise Limits-

Section 2.120 and 2.101 of the SEPP (Transport & Infrastructure) 2021 replaced clause 102 and clause 87 of the SEPP 2007 which states that where a development for residential use and is located in or adjacent to a relevant busy road /rail corridor, a consent authority must not grant

consent unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

**For Clauses 87 (Rail) and 102 (Road):**

- If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following $LA_{eq}$ levels are not exceeded:
  - in any bedroom in the building : 35dB(A) at any time 10pm–7am
  - anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time.

Simlar to the above newly adopoted section 2.120 of the SEPP (Ttransport & Infracstructure) 2021 states the following:

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

(a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,

(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

This means that the full period LAeq, 9 hours between the hours 10pm-7am of any bedroom in a residential accommodation is to be less than 35 dB(A) and 40 dB(A) anywhere else in the accommodation, at any time.

External façade recommendations will be provided in Section 5.0 of this report to ensure compliance with the above internal amenity criteria.

## 5.0 BUILDING COMPONENT RECOMMENDATIONS

The façade specification can be conservatively estimated using the following formula:

$R_w = L_{(ext)} - L_{(int)} + 10 \log (S/A) + ADJ$ where

$R_{w=}$ Transmission loss of room façade/roof.
$L_{(ext)=}$ External Noise level L eq $_{x\ hrs}$.= dB(A).
$L_{(int)=}$ Internal Noise level L eq $_{x\ hrs}$.= dB(A).
S = Total exterior surface area of the room.
A = Total sabins of absorption of the room.
ADJ = 3 + F+ G where F = 2 for Rail noise, F= 4 for Traffic noise with negligible trucks [percentage < 10%], and F= 6 for Traffic Noise with more than 10% trucks.

G allows for Primary angles of sound per the table below;

| Angle of Incidence, deg. | Adjustment (G), dB |
|---|---|
| 0-30 | -3 |
| 30-60 | -1 |
| Random | 0 |
| 60-80 | +2 |

As the façade is made up of individual elements with different transmission coefficients. The total transmission loss of the façade is calculated using the following equation where n represents each material components of the façade :

$$R_{Total} = -10log_{10}\left(\frac{1}{\sum_{n=1}^{N} S_n}\sum_{n=1}^{N} S_n\tau_n\right)$$

## 6.0 FAÇADE & ROOF BUILDING COMPONENTS

The most practical building façade and roof components and material specifications to suit the required noise reduction indices for the above project are provided in Table 6.1 below:

**Table 6.1 Windows/Sliders, Doors, Walls & Roof Specifications**

| Building Component | Rw Rating to be Achieved |
|---|---|
| **Windows & Sliding Doors in Living/Dining/Kitchen and Bedroom Areas of** Residential Units & Childcare facing **or** in line of sight of Victoria Rd, are to be Acoustic DGU (Profilco Combo) 10.38mm Lam / 14 Air / 6.38mm glass with full perimeter Schlegel Q-Lon acoustic seals (1) (2) (3). | **39** |
| **Windows & Sliding Doors in Living/Dining/Kitchen and Bedroom Areas of all Residential Units and Childcare Centre facing Blaxland Rd AND Residential Units AG01 & AG02** are to be 12.38mm laminated type with full perimeter Schlegel Q-Lon acoustic seals (Ph: 8707-2000) in a heavy commercial frame section. (1) (2) (3) | **37** |
| **All Other Windows & Sliding Doors in Living/Dining/Kitchen and Bedroom Areas of Residential Units and in the Childcare Centre** are to be 10.38mm laminated glass with full perimeter Fin Mohair Woven Brush Seals in a heavy/semi commercial frame section(1)(2)(3). | **35** |
| **Windows in non-habitable areas (Bathrooms/Laundries/Storage Areas etc)** are to be 6 mm and in accordance with AS 2047 (Windows in Buildings) (1)(2)(3). | **30** |
| **Units Entry Doors** are to be solid core 42mm thick, soft plastic gasket around sides, top and drop seal at base or any other combination having an STC of minimum 30 (2)(3) | **30-33** |

| | |
|---|---|
| **External Walls** are to be 270/250 mm double brick, brick veneer, hebel, dincel construction or any other method of wall construction with Rw > 50. (2)(3) | **50** |
| **Roof** is to be minimum 150mm Concrete Roof (3).- Rw + Ctr ≥ 50 dB, and L n,w < 62 | **60** |

NB: This report is to be read in conjunction with the BASIX certificate and any other related building specification. (1). No through weep holes in windows/sliders. (2) All gaps between window & door frames and the masonry walls are to be sealed using acoustic foam Hilti CP620 or similar. Glass wool batts should be applied prior to the application of the foam to seal larger gaps. (3) All gaps are to be acoustically sealed.

*****Glazing Notes -Leaks & Glazing Attenuation-**

- The Acoustic performance of a glazing system highly depends on the leaks around and within the glazing frame and façade. A double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 30 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, a double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.
- A 10.38mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 29 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, 10.38m mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.
- A double-glazing system with Rw of 40, a 10.38m mm laminated glazing system with Rw of 35, and a 6.38 mm laminated glazing system with Rw of 32 will all attain almost the same Rw of around 20 (less than that of 3.0 mm float glass) at a leak of 1 % in the façade or within/around the glazing system.

The graph below shows the actual transmission loss achieved inside a room with different glazing thicknesses relative to small leaks occurring along the window frame and façade.


- <u>A test report is to be provided from a recognized acoustic laboratory, verifying that the glazing system (glass, frame and seals) will meet the nominated sound rating required.</u>

# 7.0 ACCEPTABLE NOISE LEVEL FROM PROPOSED DEVELOPMENT– Noise Break out -

## 7.1 NSW NOISE POLICY FOR INDUSTRY (2017)

The above policy seeks to promote environmental well-being through preventing and minimizing noise by providing a framework and process for deriving noise limits conditions for consent and licenses.

The Noise Policy for Industry 2017 recommends two separate noise criteria to be considered, the Intrusive Noise Criteria and the Amenity Noise Criteria. A project noise trigger level being the lowest of the amenity and the intrusiveness noise level is then determined.

If the predicted noise level $L_{Aeq}$ from the proposed project exceeds the noise trigger level, then noise mitigation is required. The extent of any 'reasonable and feasible' noise mitigation required whether at the source or along the noise path is to ensure that the predicted noise level $L_{Aeq}$ from the project at the boundary of most affected residential receiver is not greater than the noise trigger level.

### 7.1.1 AMENITY NOISE CRITERIA

The amenity noise levels presented for different residential categories are presented in Table 2.2 of the Noise Policy for Industry 2017. These levels are introduced as guidance for appropriate noise levels in residential areas surrounding industrial areas.

The recommended amenity noise levels for the proposed development No. 691-695 Victoria Rd, Ryde are presented in Table 7.1.1.1 below.

**Table 7.1.1.1- Recommended Amenity Noise levels**

| ***Type of Receiver*** | ***Area*** | ***Time Period*** | ***Recommended Leq Noise Level, dB(A)*** |
|---|---|---|---|
| Residence | Urban | Day | 60 |
| | | Evening | 50 |
| | | Night | 45 |

Where a noise source contains certain characteristics such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content, a correction is to be applied which is to be added to the measured or predicted noise levels at the receiver, before comparison with the criteria. Shown below are the correction factors that are to be applied:

**Table 7.1.1.2 – Modifying Factor Corrections as per Fact Sheet C (Noise Policy for Industry 2017)**

| ***Factor*** | ***Correction*** |
|---|---|
| Tonal Noise | + 5 dB [1,2] |
| Low-Frequency Noise | + 2 or 5 dB [1] |

| | |
|---|---|
| Intermittent Noise | + 5 dB |
| Duration | + 0 to 2 dB(A) |
| Maximum Adjustment | Maximum correction of 10 dB(A)[1](excluding duration correction) |

1. Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.
2. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.

Correction for duration is to be applied where a single-event noise is continuous for a period of less than two and a half hours in any assessment period. The allowable exceedance of the $L_{Aequ,15min}$ equivalent noise criterion is depicted in Table 7.1.1.3 for the duration of the event. This adjustment accounts for unusual and one-off events and does not apply to regular and/or routine high-noise level events.

**Table 7.1.1.3 – Adjustment for Duration as per Fact Sheet C (Noise Policy for Industry 2017)**

| ***Allowable duration of noise (one event in any 24-hour period)*** | ***Allowable exceedance of LAeq,15min equivalent project noise trigger level at receptor for the period of the noise event, dB(A)*** | |
|---|---|---|
| | ***Daytime & evening (7 am–10 pm)*** | ***Night-time (10 pm–7 am)*** |
| 1 to 2.5 hours | 2 | Nil |
| 15 minutes to 1 hour | 5 | Nil |
| 6 minutes to 15 minutes | 7 | 2 |
| 1.5 minutes to 6 minutes | 15 | 5 |
| less than 1.5 minutes | 20 | 10 |

According to Section 2.4 of the above policy, the project amenity noise level is determined as follows:

**Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)**

To convert from a period level to a 15-minute level, a plus 3 is added as per section 2.2 of the policy.

Therefore, the project amenity noise level for the proposed development at No. 691-695 Victoria Rd, Ryde is as follows:

- Day period: **60** – 5 + 3 = 58 dB(A)
- Evening period: **50** – 5 + 3 = 48 dB(A)
- Night period: **45** – 5 + 3 = 43 dB(A)

### 7.1.2 INTRUSIVENESS NOISE CRITERIA

Section 2.3 of the NSW Noise Policy for Industry summarizes the intrusive criteria as below:

$$L_{Aeq,\,15\,minute} \leq \text{rating background level plus 5}$$

While the background noise level known as $LA_{90,15\ minutes}$ is the Noise exceeded 90% percent of a time period over which annoyance reactions may occur (taken to be 15 minutes). The RBL is defined as the overall single-figure $L_{A90,15\ minutes}$ background level representing each assessment period (day/evening/night) over the whole monitoring period.
For the short-term method, the rating background noise level is simply the lowest measured LAF90,15min level.

For the long-term method, the rating background noise level is defined as the median value of:

- all the day assessment background levels over the monitoring period for the day
- all the evening assessment background levels over the monitoring period for the evening, or
- all the night assessment background levels over the monitoring period for the night.

The predicted noise from the source $L_{Aeq,15\ min}$ is measured as at the most affected point within the most affected residential at the point where the most impact occurs. Therefore, the acceptable $L_{eq}$ noise intrusiveness criterion for the proposal during the day, evening and night is as follows:

- **Day period:** **44 + 5 = 49 dB(A)**
- **Evening period:** **41 + 5 = 46 dB(A)**
- **Night period:** **40 + 5 = 45 dB(A)**

### 7.1.3 PROJECT NOISE TRIGGER LEVEL

A summary of intrusiveness and amenity noise levels as determined in sections 7.1.1 & 7.1.2 are shown in Table 7.1.3.1 below:

**Table 7.1.3.1- Summary of Intrusiveness and project amenity noise levels**

| ***Period*** | ***Intrusiveness Noise Level dB(A)*** | ***Project Amenity Noise level dB(A)*** |
|---|---|---|
| Day Time (7:00am-6:00pm) | 49 | 58 |
| Evening Time (6:00pm-10:00pm) | 46 | 48 |
| Night & Early Morning (10:00pm – 7:00am) | 45 | 43 |

The project noise trigger level is the lower (that is, the most stringent) value of the amenity and intrusiveness noise levels for the day, evening and night-time. Therefore, the project noise trigger levels for the proposed development are as shown below:

- **Day period $L_{Aeq,15\ min}$: 49 dB(A)**
- **Evening period $L_{Aeq,15\ min}$: 46 dB(A)**
- **Night period $L_{Aeq,15\ min}$: 43 dB(A)**

The proposed developments and its activities including all mechanical plant will not exceed the project noise trigger level at the most sensitive location, provided all noise control recommendations in Section 9.0 are adhered to.

## 7.2 TRAFFIC NOISE GENERATION CRITERIA

Table 3 in Section 2.3.1 of the NSW Road Noise Policy, sets out traffic noise assessment criteria as follows:

**Table 7.2.1 – NSW Road Noise Policy Traffic Noise Criteria**

| **Road Category** | **Type of Project/Land Use** | **Assessment Criteria – dB(A)** | |
|---|---|---|---|
| | | **Day (7am – 10pm)** | **Night (10pm – 7am)** |
| Local Roads | Existing Residences affected by additional traffic on existing local roads general by land use developments | $L_{Aeq\ (1\ hour)}$ 55 (external) | $L_{Aeq\ (1\ hour)}$ 50 (external) |

## 7.3 NOISE GUIDE FOR LOCAL GOVERNMENT

The Department of Environment and Conservation (NSW) published the amended *Noise Guide for Local Government* in October 2010. The policy is specifically aimed at assessing noise from light industry, shops, entertainment, public buildings, air conditioners, pool pumps and other noise sources in residential areas.

Section 2.2.3 of the Noise Guide for Local Government recommends noise measurements and an intrusive noise level when attempting to achieve acceptable and achievable noise limits.

Section 2.2.1 of the Noise Guide for Local Government states that a noise source is generally considered to be intrusive if the noise from the source when measured over a 15-minute period exceeds the background noise by more than 5 dB(A). Therefore, the noise criteria are as follows:

- **Day period: 46 + 5 = 51 dB(A)**
- **Evening period: 44 + 5 = 49 dB(A)**
- **Night period: 44 + 5 = 49 dB(A)**

The appropriate regulatory authority (Local Council) may, by notice in writing given to such a person, prohibit the person from causing, permitting or allowing:

1. any specified activity to be carried on at the premises, or
2. any specified article to be used or operated at the premises.

or both, in such a manner as to cause the emission from the premises, at all times or on specified days, or between specified times on all days or on specified days, of noise that, when measured at any specified point (whether within or outside the premises,) is in excess of a specified level.

It is an offence to contravene a noise control notice. Prior to being issued with a noise control notice, no offence has been committed.

### 7.3.1 SLEEP DISTURBANCE

In order to minimize the potential of sleep disturbance, Section 2.2.4 of the Noise Guide for Local Government recommends that $L_{A1,1\text{-minute}}$ level of any noise outside a bedroom should not exceed the background noise level by more than 15dB.

**$L_{A1,\ 1\ minute}$ =< 44 + 15= 59 dB(A) outside bedroom window of nearest residential receiver.**

Similar text about sleep arousal is adopted in the Noise Policy for Industry 2017 as below:

**Where the subject development/premises night-time noise levels at a residential location exceed:**

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

**a detailed maximum noise level event assessment should be undertaken.**

Further studies by the enHealth Council (2004) and the guidelines published by the World Health Organisation (1999) were reviewed and analysed in terms of the guidance on noise exposure and sleep disturbance. The enHealth report states that:

*'as a rule for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) $L_{A,\ (Max)}$ more than 10 or 15 times per night'.*

## 8.0 PREDICTED NOISE LEVELS ARISING FROM THE PROPOSED BUILDING USE INCLUDING MECHANICAL PLANT

The main noise sources arising from the use of the proposed building are classified into five main noise sources:

- Vehicles on the Road, and in the car park arriving and departing the building.
- Trucks in Loading Dock
- Noise from the Outdoor Common Areas
- Noise from mechanical plant & air-conditioning and
- Noise from the Childcare – Addressed in separate report attached- Ref: 2023-374B Rev.2

### 8.1 NOISE ON BLAXLAND RD FROM ADDITIONAL TRAFFIC GENERATION

The Traffic and Parking Assessment prepared by VARGA TRAFFIC PLANNING P/L (dated 13th May, 2025) predicted 119 *net* additional vehicle movements in the AM peak hour and 101 *net* additional vehicle movements in the PM peak hour.

The nearest residential receivers that will be affected by additional traffic noise generation from the proposed development (including the childcare) will be the residential properties along Blaxland RD. The predicted Noise levels due to additional traffic generation are presented in Table 8.1.1 below:

**Table 8.1.1 – Predicted Noise from Traffic Generation on Blaxland Rd at 1.0m from Facade of Nearest Receivers**

| Activity | Period | Expected $L_{eq\ 1hr}$ dB(A) from Additional Traffic at 1.0m from Façades on Blaxland Rd, | Complies with Traffic Noise Criteria- as per Section 6.4 |
|---|---|---|---|
| **Noise from Additional Traffic Generation** | AM Peak Hour | **53 dB(A)** | Yes <55 dB(A) Day & Evening |
| | PM Peak Hour | **48 dB(A)** | Yes < 50 dB(A) Night |

### 8.2 NOISE FROM CARS ENTERING/EXITING THE BASEMENT CARPARK

Car parking noises may typically comprise of adults talking, children's voices, car radios, cars starting up and car doors closing. Measurements and observations conducted at various other developments were saved in our database in order to obtain generic car park noise data. The predicted noise levels due to vehicles arriving and departing the site will be governed by existing background noise levels (as stated above).

**Table 8.2.1 – Car Park Noise Source Levels**

| Car Park Noise Source | Average Sound Power Level, dB(A) |
|---|---|
| Car Door Closing | 95* |
| Car Starting | 91* |
| Car Accelerating | 91 |
| Car Moving/Truck Moving | 81/95 |

***Taking place inside enclosed carpark.**

For vehicles entering the basement carpark, the only noise generated will be from cars moving in and out of the driveway. The remainder of car activities listed in the table above will occur inside the basement and therefore noise produced by those activities will be attenuated by the basement enclosure.

Entry to the basement will be via a ramp located at the at the end of a proposed public laneway between Building A and Buildings B & C. The receiver closest to the driveway is No. 2 Hatton St, (R1). The Predicted noise levels at the boundary of the nearest residential receiver due to cars entering and exiting the basement car park are presented in Table 8.2.2 below. Noise attenuation loss from the basement enclosure, the distance to the nearest receiver, as well as any sound barriers (fences) have been taken into account.

**Table 8.2.2 – Predicted Noise from Vehicles Entering and Exiting the Carpark at Boundary of No. 2 Hatton St – Most Critical**

| Activity | Period | Expected Leq dB(A)*, ** | Compliance with Noise Trigger Levels as per Section 7.1.3 |
|---|---|---|---|
| **Vehicles Entering/Exiting the Basement Car Park** | 7.00am - 6.00pm (Day) | 40 dB(A) | **Yes ✓** ≤ 49 dB(A) |
| | 6:00pm – 10:00pm (Evening) | 38 dB(A) | **Yes ✓** ≤ 46 dB(A) |
| | 10:00pm – 7:00am (Night) | 38 dB(A) | **Yes ✓** ≤ 43 dB(A) |

*Assuming gap free fencing on the western boundary as per Figure 10.
**Based on Traffic Generation Data

Similarly the $L_{Amax}$ noise level from cars entering and exiting the basement as presented in Table 8.2.3 below in the late night hours and early mornings complies with the Sleep disturbance criteria presented in section 7.3.1 of this report.

**Table 8.2.3 – Predicted $L_{Amax}$ Noise from Vehicles Entering and Exiting the Carpark at Boundary of No. 2 Hatton St – Most Critical - LA 1 min.**

| Activity | Period | Expected LA 1 min. dB(A) at External Window* | Complies with Sleep Disturbance Criteria - as per Section 7.3.1* |
|---|---|---|---|
| **Vehicles Entering/Exiting the Basement Car Park** | 10:00pm – 7:00am (Night) | 45 dB(A) | Yes < $L_{90}$ + 15 (59) dB(A)<br>Yes - $L_{AFmax}$ < 52<br>Yes - $L_{AFmax}$ < RBL + 15 (55) dB(A). |

*Assuming gap free fencing on the western boundary as per Figure 10.

## 8.3 NOISE FROM PROPOSED LOADING DOCK

The proposed site will also have a loading dock accessible from the public laneway (Figure 8 – Proposed Loading Dock). Noise produced by trucks using the proposed loading dock may have an effect on the nearest residential receivers near the proposed site.

The proposed loading dock can accommodate a maximum of (1) truck at a time of up to 12.5m in length. Typical power levels for trucks operating in the loading dock are presented below. The garbage bay is adjacent to the loading dock and garbage trucks accessing the loading dock will contribute as an additional noise source.

**Table 8.3.1 - Loading Dock Noise Levels**

| ***Source*** | ***Loading dock and vehicle movement sound power levels, dB Leq Octave band centre frequency (Hz)*** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **63** | **125** | **250** | **500** | **1K** | **2K** | **4K** |
| Garbage truck/semi-trailer movement | 114 | 116 | 111 | 106 | 104 | 103 | 102 |
| 5-10 tonne truck air brake | 100 | 94 | 91 | 99 | 106 | 107 | 105 |
| 5-10 tonne truck movement | 97 | 96 | 90 | 91 | 94 | 95 | 88 |
| Van or small truck movement | 95 | 90 | 89 | 88 | 89 | 91 | 83 |
| Unloading of vehicles and bin/skip emptying | 109 | 109 | 109 | 108 | 108 | 110 | 110 |

The predicted noise levels at the boundary of the nearest residential receivers LAeq $_{15min}$ due to trucks loading & unloading are presented in Table 8.3.2 below.

**Table 8.3.2 – Predicted Noise levels from Loading Dock and Carpark at boundary of No. 2 Hatton St – Most Critical**

| Activity | Period | Expected Leq dB(A)* | *Compliance with Noise Trigger level (Point A)- as per Section 7.2.3.** |
|---|---|---|---|
| **Noise impact from truck in the loading dock/carpark **** | 7.00am - 6.00pm (Day) | 36 dB(A) | Yes < 49 dB(A) |
| | 6:00pm – 10:00pm (Evening) | 36 dB(A) | Yes < 46 dB(A) |
| | 10:00pm – 7:00am (Night) | - | N/A** |

*Assuming gap free fencing on the western boundary as per Figure 10
**No Trucks allowed in loading Dock during night hours

## 8.4 NOISE IMPACT OF OUTDOOR COMMON AREAS

As per the architectural plans by CD Architects dated May, 2025 the proposed development at No. 691-695 Victoria Rd, Ryde will include the following outdoor common areas [Figure 9 – Proposed Outdoor Common Areas (Buildings A, B &C)]:

- Outdoor common area on the ground floor adjacent to Building A
- Outdoor common area on Level 2 adjacent to Building C
- Rooftop outdoor common area on Level 8 Building B

Residents of the proposed development may congregate in these outdoor common areas during casual social gatherings, which has the potential to impact surrounding residential receivers.

Outdoor common areas will be restricted to Day and Evening Use only (7:00am – 10:00pm).

As per Harris/Pearson, Bennet, & Fidell (1977) report, the sound power level of (1) person talking (male & female) is as per Table 8.4.0.1 below.

**Table 8.4.0.1 – Sound Power Level of Male & Females at different vocal levels**

| Vocal Effort | No. of Talkers | Sound Power Levels [dB] at Octave Band Centre Frequencies [Hz]*,**,*** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A) |
| **Females** | | | | | | | | | |
| Casual | 1 | 48.0 | 61.0 | 61.0 | 54.0 | 51.0 | 47.0 | 48.0 | 61.0 |
| Normal | 1 | 49.0 | 63.0 | 66.0 | 61.0 | 56.0 | 44.0 | 50.0 | 66.0 |
| Raised | 1 | 47.0 | 67.0 | 72.0 | 70.0 | 66.0 | 61.0 | 54.0 | 74.0 |
| Loud | 1 | 47.0 | 62.0 | 77.0 | 79.0 | 76.0 | 70.0 | 62.0 | 82.0 |
| Shouted | 1 | 48.0 | 68.0 | 82.0 | 89.0 | 88.0 | 81.0 | 71.0 | 93.0 |
| **Males** | | | | | | | | | |
| Casual | 1 | 58.0 | 62.0 | 63.0 | 55.0 | 53.0 | 51.0 | 48.0 | 63.0 |
| Normal | 1 | 60.0 | 66.0 | 69.0 | 62.0 | 58.0 | 54.0 | 48.0 | 69.0 |
| Raised | 1 | 65.0 | 71.0 | 76.0 | 70.0 | 66.0 | 61.0 | 55.0 | 76.0 |
| Loud | 1 | 69.0 | 78.0 | 85.0 | 84.0 | 79.0 | 73.0 | 63.0 | 87.0 |
| Shouted | 1 | 58.0 | 83.0 | 93.0 | 97.0 | 93.0 | 85.0 | 76.0 | 100.0 |

For a number of residents (n) in any vocal category the increase in noise level at any octave band centre frequency is $\Delta L = 10\log_{10}(n)$.

The total noise level from all groups is determined using the equation:

$$L = 10 \log_{10} \left( \sum_{i=1}^{n} 10^{(L_i / 10)} \right)$$

Where $L_i$ is the noise level from each group.

The noise levels from people congregating in the rooftop terrace is calculated in accordance with ISO 9613.2 – *Acoustics – Attenuation of sound during propagation outdoors — Part 2: General method of calculation.* The predicted noise levels at the most affected residential receivers presented in Table 8.4.0.2 below:

**Table 8.4.0.2 - Predicted Noise from Outdoor Common Areas at boundaries of Most affected Residential Receivers*-**

| *Activity* | *Residential receiver* | *Period** | *Expected. Leq dB(A) at Façade of Receiver*** | *Complies with Background level + 5 ****|
|---|---|---|---|---|
| **Residents in Outdoor Common Areas (50% talking, 20% in loud voice)** | R1<br>No. 2 Hatton St, Ryde | 7.00am - 6.00pm (Day)<br>6.00pm-10:00pm (Evening) | 47 dB(A) | Yes ✓<br>< 51 – Day<br>< 49 – Evening |
| **Residents in Outdoor Common Areas (50% talking, 20% in loud voice)** | R2<br>No. 4 Hatton St, Ryde | 7.00am - 6.00pm (Day)<br>6.00pm-10:00pm (Evening) | 44 dB(A) | Yes ✓<br>< 51 – Day<br>< 49 – Evening |
| **Residents in Outdoor Common Areas (50% talking, 20% in loud voice)** | R3<br>No. 6 Hatton St, Ryde | 7.00am - 6.00pm (Day)<br>6.00pm-10:00pm (Evening) | 44 dB(A) | Yes ✓<br>< 51 – Day<br>< 49 – Evening |
| **Residents in Outdoor Common Areas (50% talking, 20% in loud voice)** | R4<br>No. 8 Hatton St, Ryde | 7.00am - 6.00pm (Day)<br>6.00pm-10:00pm (Evening) | 37 dB(A) | Yes ✓<br>< 51 – Day<br>< 49 – Evening |
| **Residents in Outdoor Common Areas (50% talking, 20% in loud voice)** | R5<br>No. 20 Blaxland Rd, Ryde | 7.00am - 6.00pm (Day)<br>6.00pm-10:00pm (Evening) | 46 dB(A) | Yes ✓<br>< 51 – Day<br>< 49 – Evening |

*Outdoor Common areas not accessible between 10:00 pm and 7:00 am
**Assuming all recommendations in Section 8.3.1 are adhered to.
*** NSW Noise Policy for Industry does not apply to Lodger/Patron noise (Section 1.5 exclusions). Background noise level + 5 applies.

### 8.4.1 OUTDOOR COMMON AREAS RECOMMENDATIONS

In order for the use of the proposed outdoor common areas [Figure 9 – Proposed Outdoor Common Areas (Buildings A, B & C)] to comply with the requirements of the NSW Industrial Noise Policy and AS 2107 'Acoustics – Recommended Design Sound Levels and Reverberation Times', we recommend the following:

- *Access to the outdoor common areas is restricted to day and evening hours only (ie 7:00am – 10:00pm)*
- *Signs are to be installed advising that access to the outdoor common areas is only permitted during the Day & Evening*
- *2.0m lapped and capped timber, colorbond or brick fences to be constructed on the western boundaries of the outdoor common areas adjacent to Buildings A and C as per Figure 10 – Proposed Sound Barrier Locations (Outdoor Common Areas)*
- *A 1.8m gap-free sound barrier is to be constructed around the perimeter of the rooftop communal area of Building B as per Figure 10 - Proposed Sound Barrier Locations (Outdoor Common Areas).*
    - *Typical barrier compositions may be as follows:*
        - *1000 mm High masonry wall + 800mm glass/Perspex screen- gap free*

*or*

        - *600 mm High planter box + 1.2m Glass/Perspex screen- gap free*

## 8.5 NOISE IMPACT OF MECHANICAL PLANT & EQUIPMENT

A range of mechanical plants, equipment and ventilation will be included in the proposed development at No. 691-695 Victoria Rd, Ryde. Noise emitted using the proposed mechanical plant is assessed by the Noise Policy for Industry 2017 and Ryde City Council requirements.

The proposed levels of basement parking are located below ground level which makes natural ventilation not possible. Thus, a mechanical extract system should be used. The mechanical ventilation system needs to achieve all required air changes for exhaust fume and extract smoke clearance in accordance with Australian Standard AS 1668.2 *"The use of ventilation and air-conditioning in buildings Mechanical ventilation in buildings"*.

A garage roller door may also be located at the entry of the car park. Predicted noise levels from the operation of garage roller doors have been estimated according to typical rollers doors installed at other developments. The average time duration for a garage roller door to fully open or close is approximately 30 seconds. Air-conditioning might also be installed in the proposed development. Typical noise levels for car park exhaust fans, condensing units and car-park roller doors are presented in Table 8.5.1 below.

**Table 8.5.1 – Typical Mechanical Plant Leq Sound Power Levels (dB(A))**

| ***Frequency [Hz]*** | ***63*** | ***125*** | ***250*** | ***500*** | ***1k*** | ***2k*** | ***4k*** | ***8k*** | ***dB(A)*** |
|---|---|---|---|---|---|---|---|---|---|
| Typical Car Park Exhaust Fan/Supply Fan | 89 | 84 | 91 | 88 | 87 | 84 | 81 | 75 | **91** |
| Typical Condensing Unit | 71 | 69 | 67 | 61 | 58 | 54 | 47 | 44 | **64** |
| Car-Park Security Roller Door | 73 | 75 | 77 | 79 | 82 | 77 | 76 | 74 | **85** |

The operation of the proposed mechanical plant & equipment will comply with the criteria of the NSW Noise Policy for Industry 2017, provided the recommendations in Section 9.0 of this report are adhered to.

### 8.6 NOISE IMPACT FROM THE PROPOSED CHILDCARE

The predicted noise levels and required noise mitigation & compliance associated with the proposed childcare are fully detailed in separate Acoustic Report ref-2023-374 C Rev.2.

### 8.7 CUMULATIVE NOISE IMPACT & COMPLIANCE

The cumulative noise emanating from the proposed development (Carpark, Loading Bay, Communal areas, proposed Childcare and Mechanical plant a& air-conditioning) will comply with the Noise trigger levels and noise limits established for this project provided all recommendations in section 9 are adhered to.

## 9.0 RECOMMENDATIONS

The recommendations listed in Table 9.1 below are essential for the noise break-out from the proposed development to comply with section 7 of this report.

**Table 9.1– Typical Noise Breakout Recommendations**

| Item | RECOMMENDATIONS |
|---|---|
| **Basement Roller Door** | • Ensure maintenance and lubrication of motor bearings, door tracks and joints.<br>• The proposed security door fitted to the car parking area entrance must be independently mounted on rubber pads to prevent vibration noise transmission through the concrete walls and/or columns. |
| **AC Condenser Units** | • We recommend that all outdoor air-conditioning units to be acoustically enclosed or set away by more than 3.0m from any boundary with a sound power level of each unit no more than 65 dB(A). |
| **General Mechanical Plant** | • We recommend acoustic assessment at CC stage of all proposed mechanical plants and equipment once the development has been approved and full Mechanical Services Plans have been prepared. In the meantime, we recommend the following:<br>o Procurement of quiet plant (when required) and the maintenance of existing plant.<br>o Strategic positioning of plant away from potential sensitive receivers. |

| | |
|---|---|
| | ○ Commercially available silencers or acoustic attenuators for air discharge and air intakes of plant.<br>○ Acoustically lined and lagged ductwork.<br>○ Acoustic screens and barriers between plant and sensitive neighboring premises; and/or,<br>○ Partially enclosed or fully enclosed acoustic enclosures around plant. |
| **Acoustic Fences/Barriers & Operating Hours** | • Outdoor Common Area Acoustic Fencing is as per Section 8.3.1 of this Report [Figure 10 – Proposed Sound Barriers (Outdoor Common Areas)]<br>• Outdoor Common Area operating hours is 7:00 a.m – 10:00 p.m<br>• Childcare Noise Modelling is presented in Acoustic Report ref-2023-374 C Rev. 2 and Childcare Acoustic Fencing/Shade Sails is as per Figures 11 & 12 in the appendix of this Report.<br>• Childcare Operating Hours 6:00 am- 6:00 pm |

*As the proposed development is still in the initial application stage, we recommend that further acoustic assessment is carried out when the development has been approved and Mechanical Services plans have been prepared for our review.*

## 10.0 DISCUSSION & CONCLUSION

The proposed development at No. 691-695 Victoria Rd, Ryde if carried out as recommended in plans and specifications and including the acoustic recommendations in this report, will meet the Australian Standard AS/NZS 2107:2016 "Acoustics – Recommended Design Sound Levels and Reverberations times for Building Interiors" and Ryde City Council requirements.

Noise Break Out from the proposed development will comply with the requirements of the NSW Noise Policy for Industry (2017) and Ryde City Council, provided recommendations in Section 9 of this report are adhered to.

Should you require further explanations, please do not hesitate to contact us.

Yours Sincerely,

M. Zaioor
M.S. Eng'g Sci. (UNSW).
M.I.E.(Aust), CPEng
Australian Acoustical Society (Member).

## APPENDIX


**Figure 1 - Site Location**

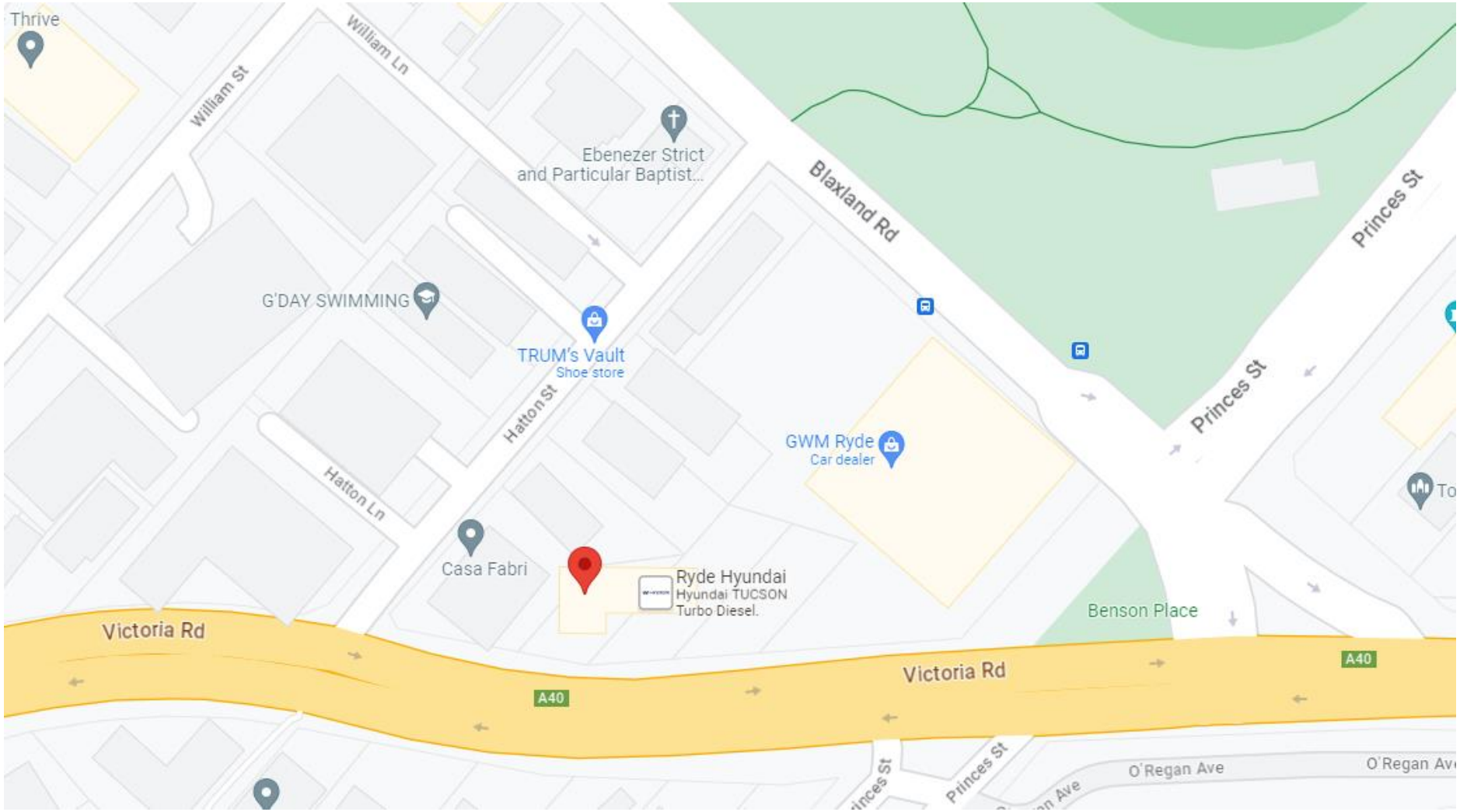



**Figure 2 Surrounding Environment**


**Figure 3 - Nearest Residential Receivers**


**Figure 4 - Noise Reading Locations - Point A and Point B**

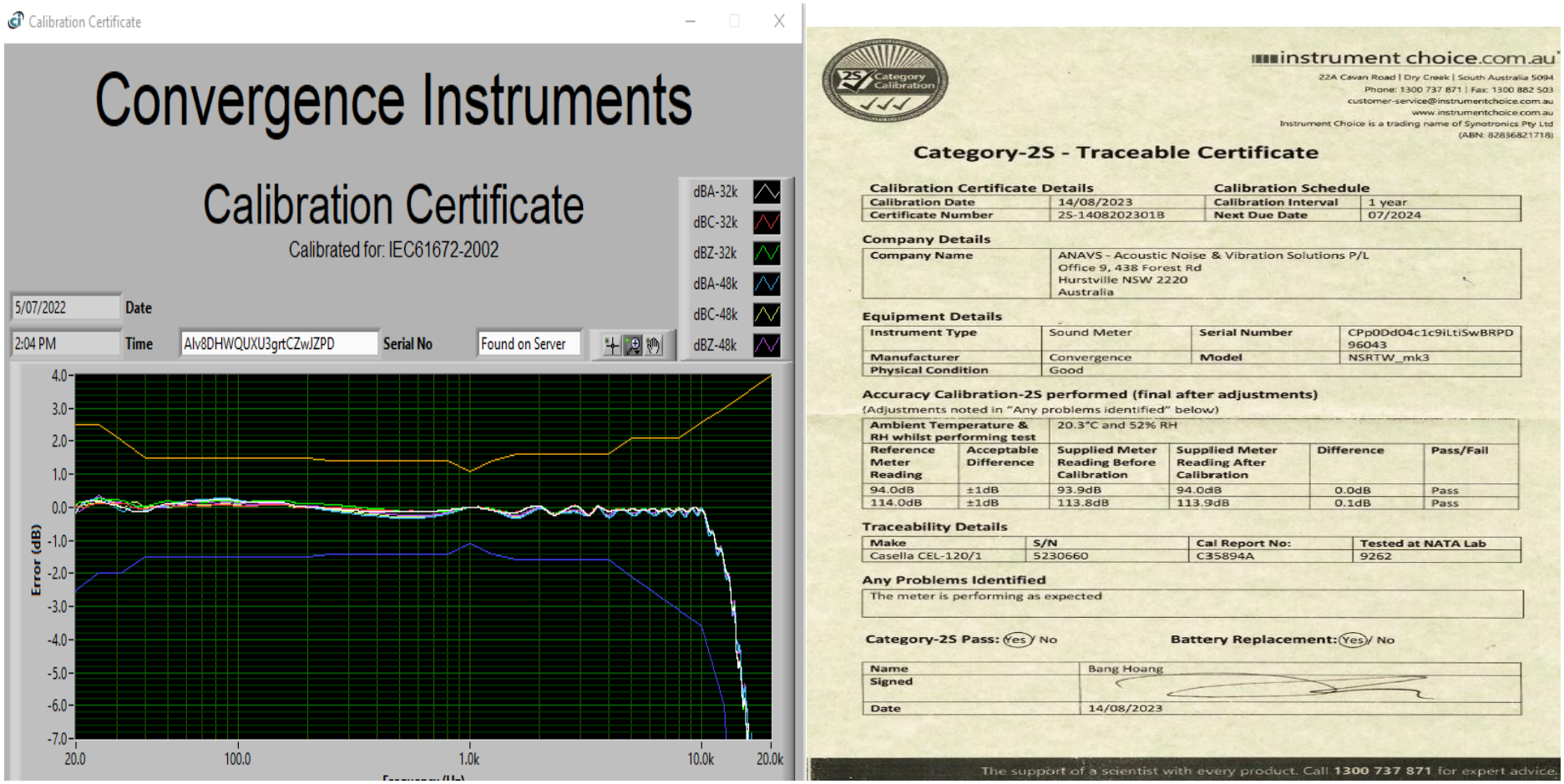



**Figure 5 - Calibration Certificates**

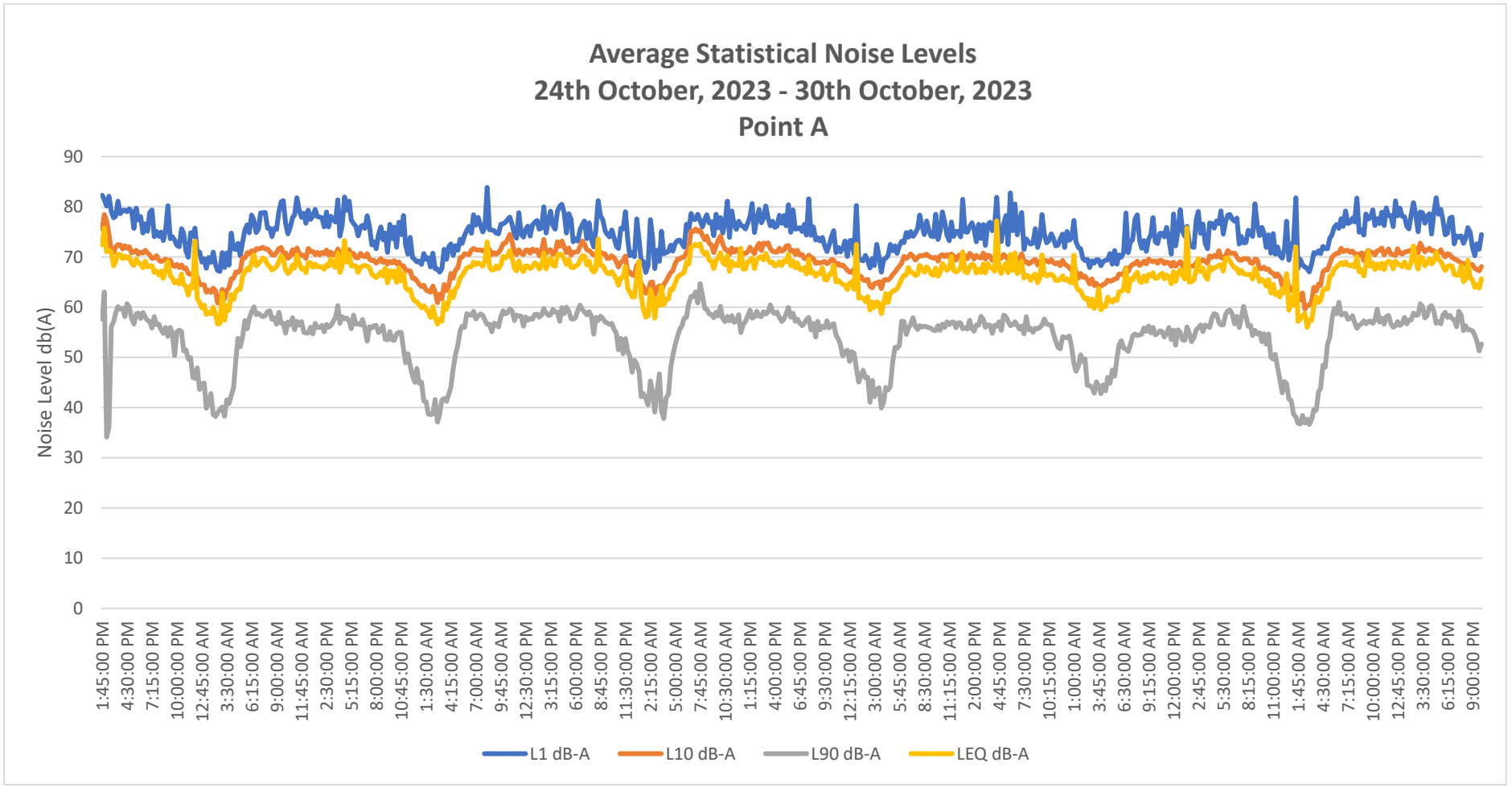



**Figure 6 - Noise Survey Point A**

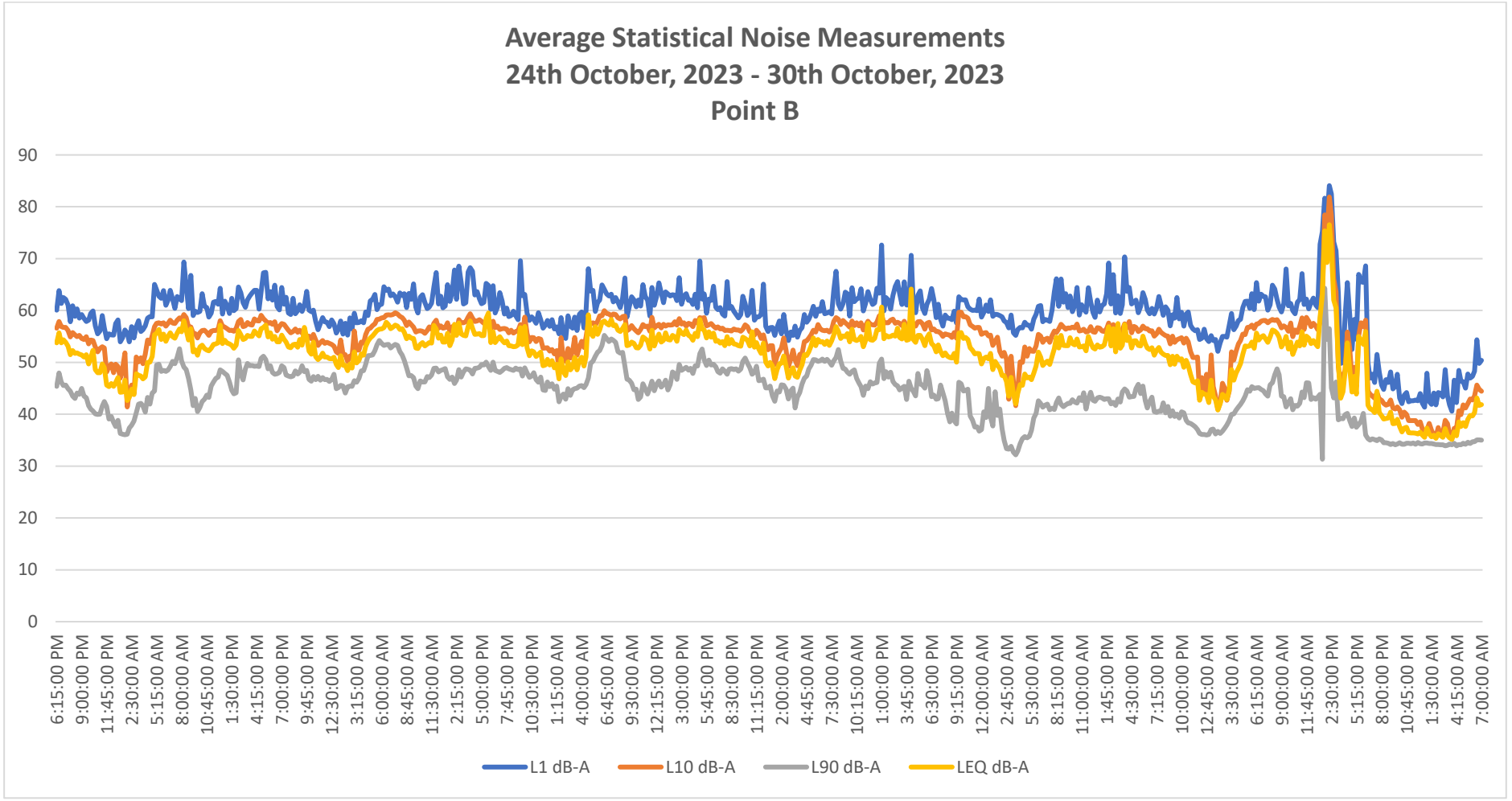



**Figure 7 - Noise Survey Point B**

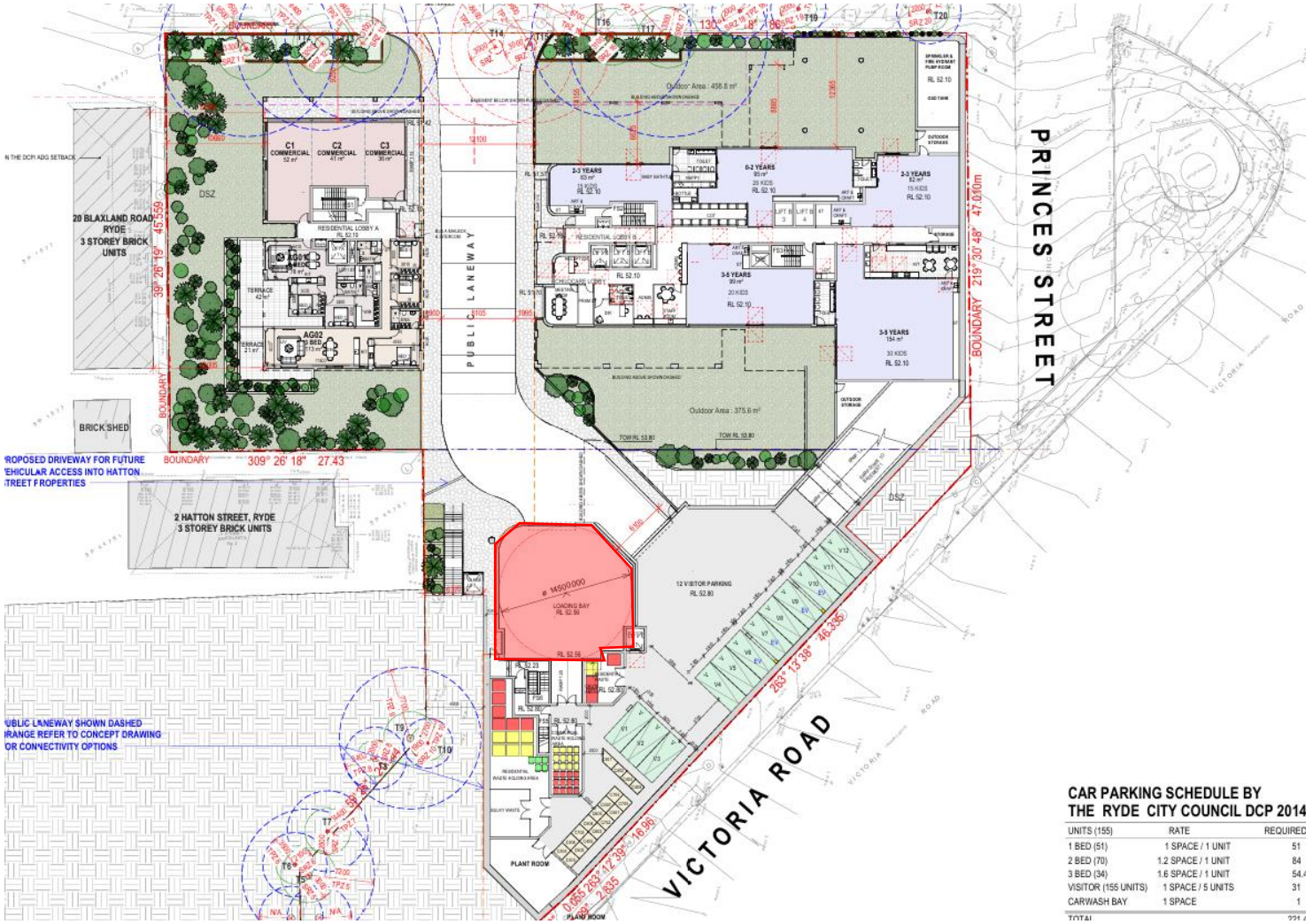


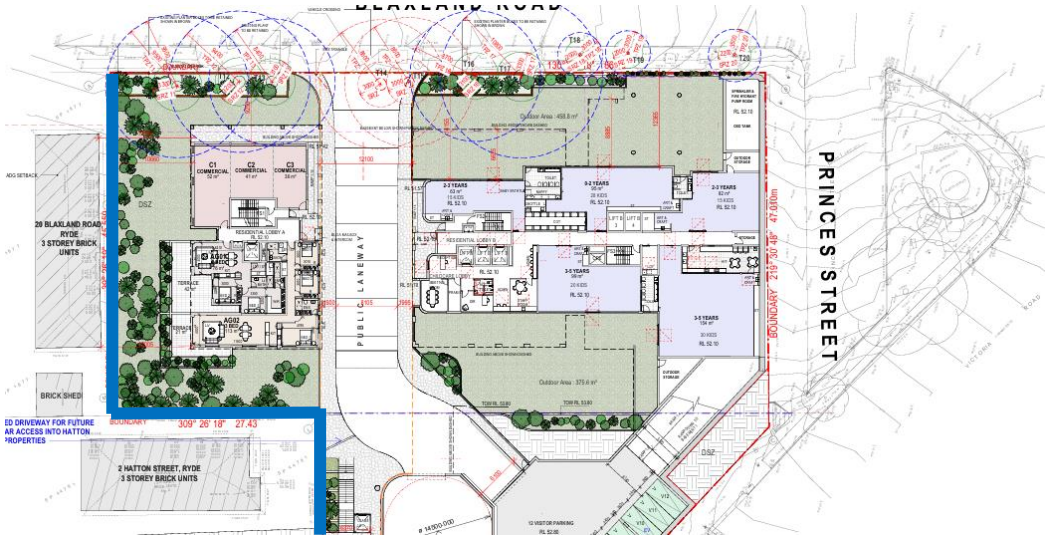

**Figure 8 - Proposed Loading Dock**


Building A

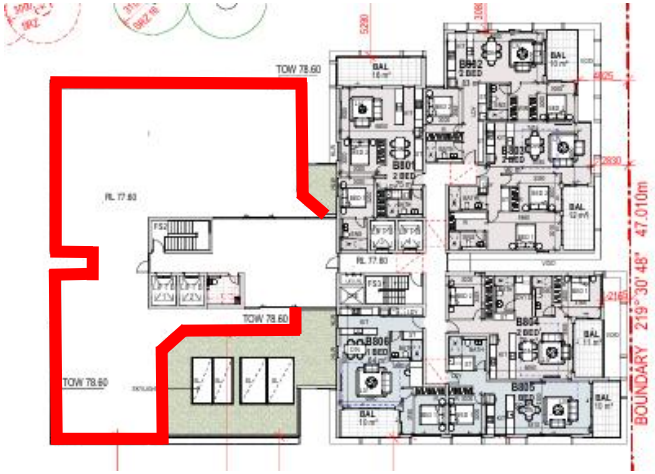

Building C


Building B

**Figure 9 - Proposed Outdoor Common Areas (Buildings A, B & C)**








2.0 m High Gap Free Fence (Capped & lapped timber fence, Color bond, bricks …)
- Outdoor Common Areas Operating Hours 7:00 a.m – 10:00 p.m.

1.8m gap-free barrier (1.0 m planter box + 800 mm glass/Perspex)
- Outdoor Common Areas Operating Hours 7:00 a.m – 10:00 p.m.

**Figure 10 - Proposed Sound Barriers (Outdoor Common Areas)**

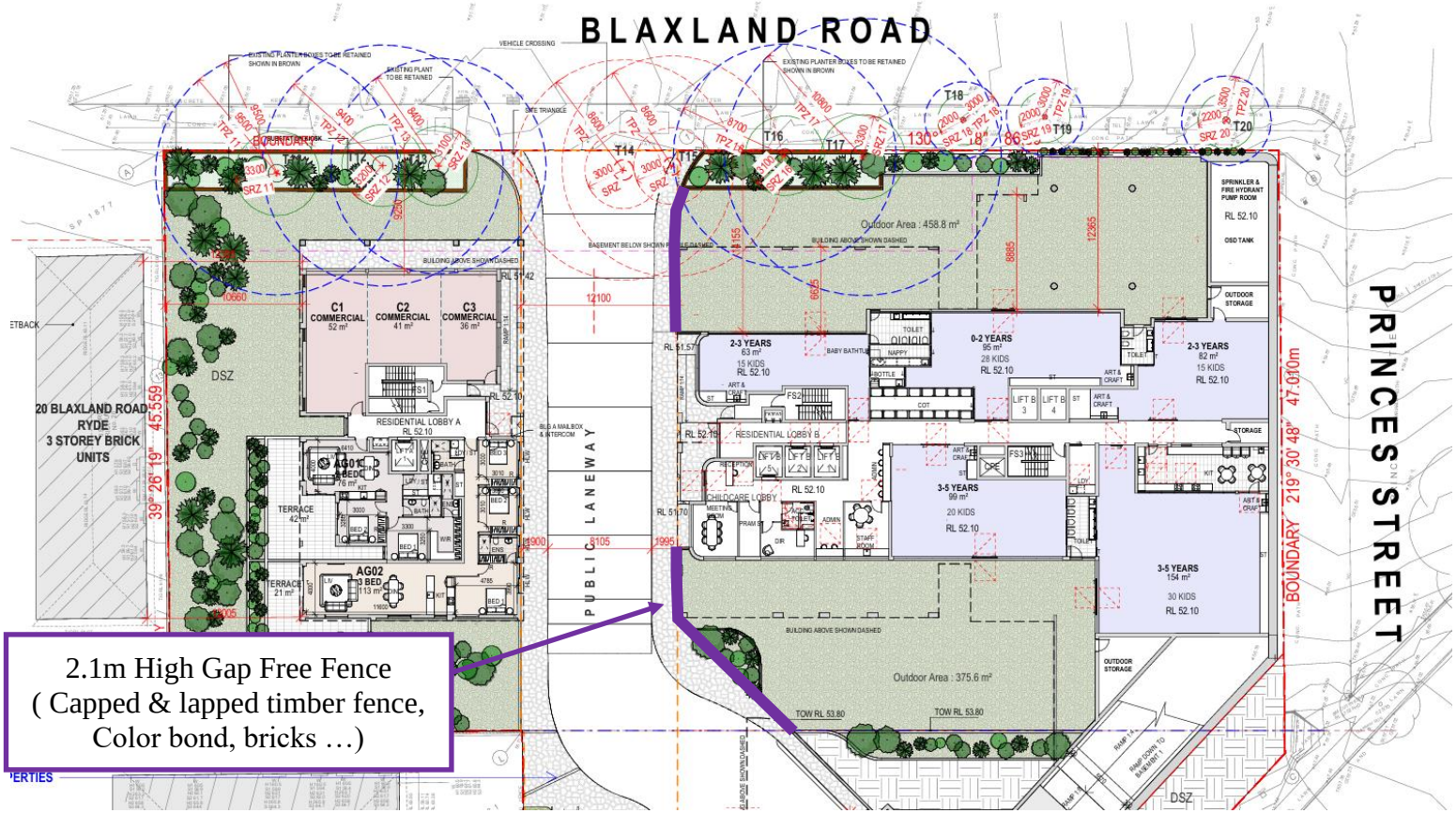



**Figure 9 - Proposed Sound Barrier Locations – Childcare Centre (Ground Floor)**

v

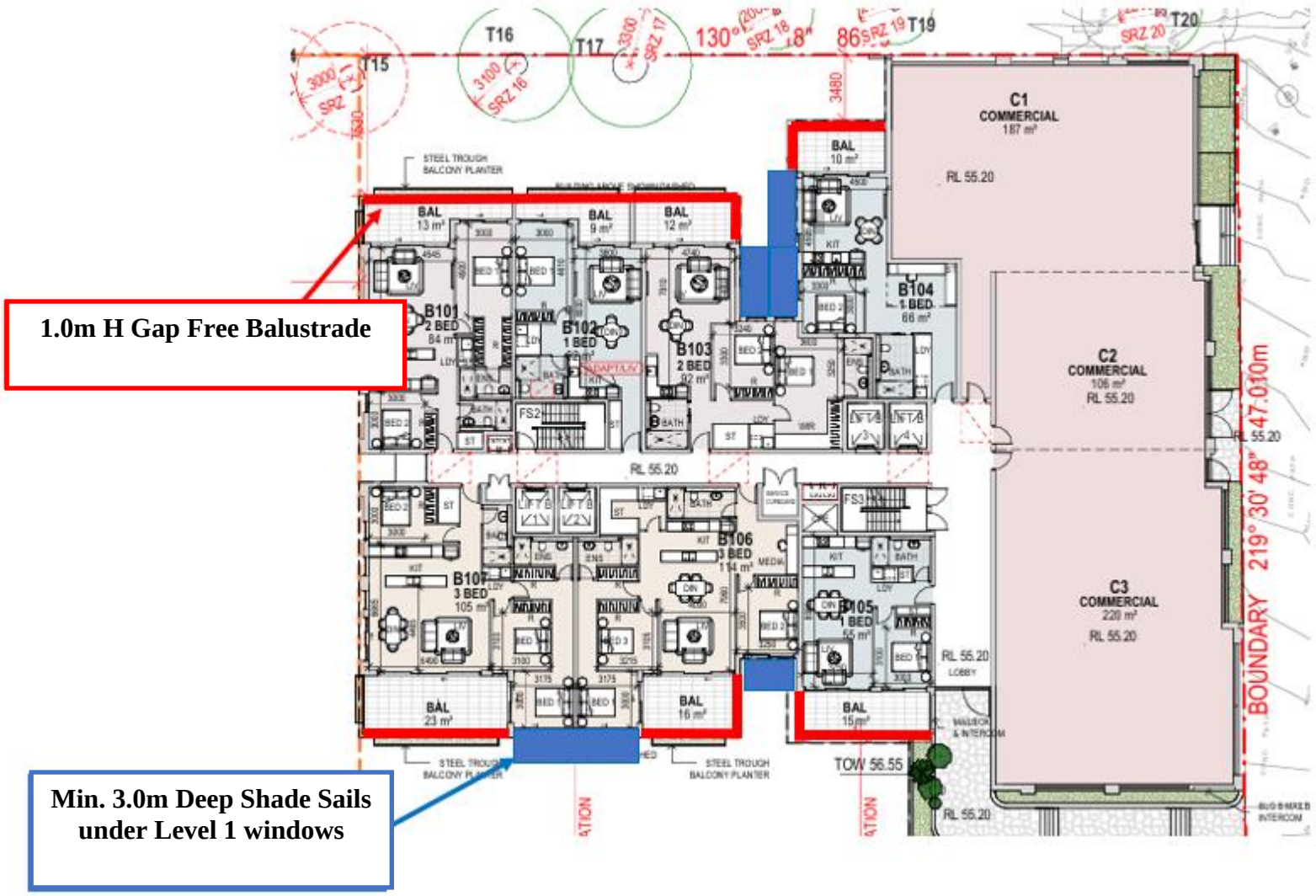



**Figure 10 - Proposed Sound Barrier Locations & Shade Sail Location - Level 1**