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Acoustic Report

- Rail Noise, Acoustic insulation between floors & walls & Mechanical Ventilation System -

For proposed development at

No. 10-12 Parmal Ave Padstow

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DOCUMENT CONTROL

Date	***Revision History***	***Prepared By:***	***Reviewed and Authorised by:***
04/07/2023	Initial Report	Domeniki Tsagaris	Moussa Zaioor
19/09/2023	Final Report	Domeniki Tsagaris	Moussa Zaioor

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1.0 SCOPE OF WORK

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. 10-12 Parmal Ave Padstow (Figure 1 – Site Location) is built to achieve acceptable internal noise levels as per Canterbury Bankstown Council requirements.

The updated architectural plans by Colin De Lore & Assoc. Pty Ltd dated September 8th 2023, are for the proposed construction of a four (4) storey mixed-use development, including one (1) level of basement parking.

The subject site is located on Parmal Ave in the suburb of Padstow. The Rail corridor servicing Padstow (T8 Airport line) is located approximately 15 meters north of the site at level more than 3m deeper than existing ground levels. (Figure 2 – Surrounding Environment).

Noise intrusion levels (Noise Break-in) from the surrounding environment are to be within the limits adopted by AS 2107 'Acoustics – Recommended Design Sound Levels and Reverberation Times' and Clause 87 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.

Noise Break-out from the use of the proposed building, including all proposed mechanical plant and equipment is to comply with the NSW Noise Policy for Industry (2017), NSW Road Noise Policy and Canterbury Bankstown Council requirements.

2.0 NOISE SURVEY, INSTRUMENTATION & RESULTS

On July 6th, 2023 an engineer from this office went to the proposed development at the above address and carried out noise measurements out near the proposed building line facing the railway corridor. (Figure 3 – Noise Reading Locations – Point A).

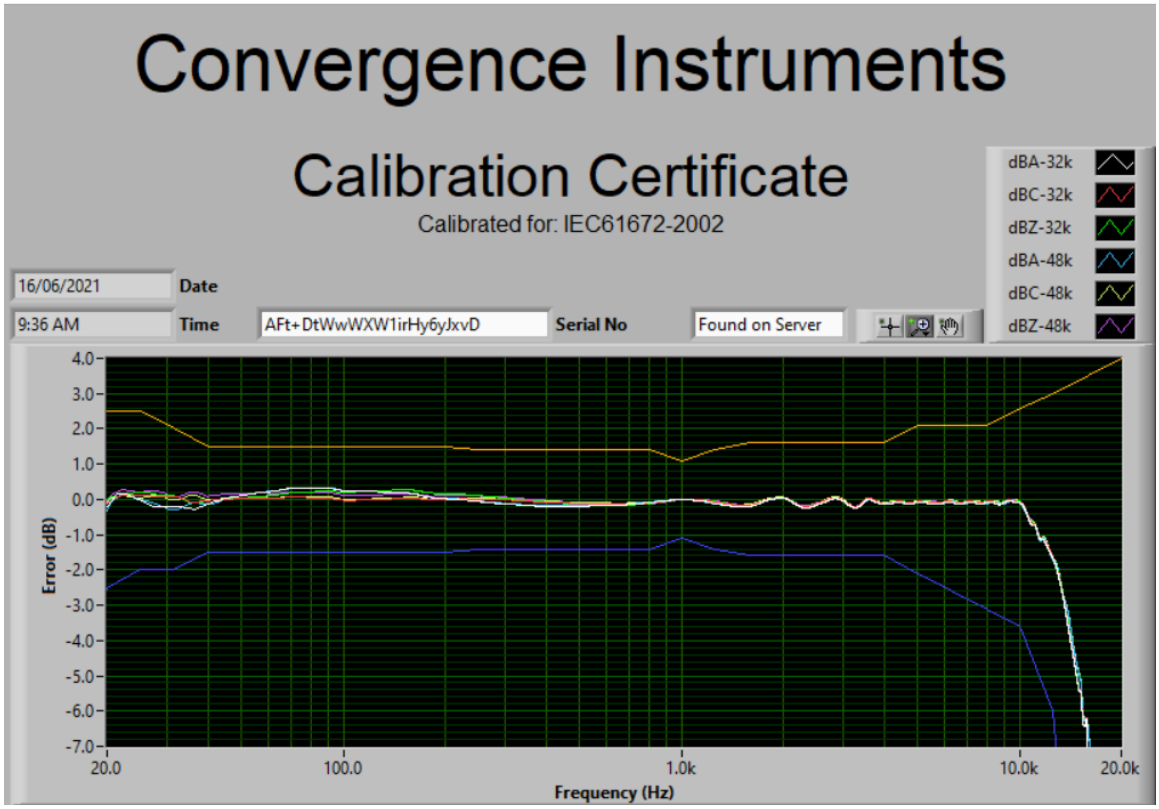
The unattended environment noise monitoring was conducted for a period of seven (7) days between July 6th, 2023 and July 13th, 2023. The noise surveys were conducted to determine a conservative reading of the existing $L_{(A90,\ 15\ minutes)}$ and $L_{(Aeq,\ 15\ minutes)}$ during the Day & Evening [7:00 – 22:00] & Night/Early Morning [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.

AFt+DtWwWXW1irHy6yJxvD- Office Tag- machine 3-. The sound logger 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 logger is factory calibrated and calibration certificate dated 16/06/2021 is presented below:



Calibration Certificate

The microphone was positioned 1.5m from ground level. The machine was calibrated prior and after reading using our Svantek SV 33A S/N: 90200 class 1 Calibrator with No

significant drift recorded. Any readings affected by strong wind or rain have been disregarded. A Summary of those readings are presented in the tables below:

Table 2.1- Summary of Unattended Noise Readings at Point A
6th July, 2023 – 20th July, 2023*

Measurement Location	*Time Period*	*LAeq 15min dB(A)**	*LA90 15min dB(A)*	*(RBL)** dB(A)*
Point A – Front Boundary facing Railway Corridor	***Day (7am-6pm)***	50	43	40
	Evening 6pm-10pm	49	43	41
	Night/Early Morning (6pm-7am)	44	40	36

***Site is mainly affected by Rail**
****RBL is calculated as per Fact Sheet B of the NPfI (2017)**

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 are presented in Figure 4 – Noise Survey Point A.

https://www.weatherzone.com.au/station/SITE/66137/observations/2023-07-06
www.weatherzone.com.au/station/SITE/66137/observations/2023-07-07
https://www.weatherzone.com.au/station/SITE/66137/observations/2023-07-10

PART 1 RAIL NOISE ASSESSMENT – *NOISE BREAK IN* –

Noise break-in into the proposed development will mainly be from the rail corridor 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 87 of the SEPP.

3.1 Development Near Rail Corridors and Busy Roads – Interim Guidelines & Clause 87 of the SEPP

The development is to comply with the Department of Planning's document titled "*Development Near Rail Corridors and Busy Roads – Interim Guidelines"*. This document is referred to in this report as the Interim Guideline.

Section 3.5.1 of the abovementioned guideline provides a guide as to the level of assessment required when noise sensitive developments are located in the vicinity of existing rail lines. The subject site is around 15 meters away from the operational railway track. As per Figure 3.1 (presented below) of the Interim Guideline, noise mitigation should be incorporated into the proposed development.

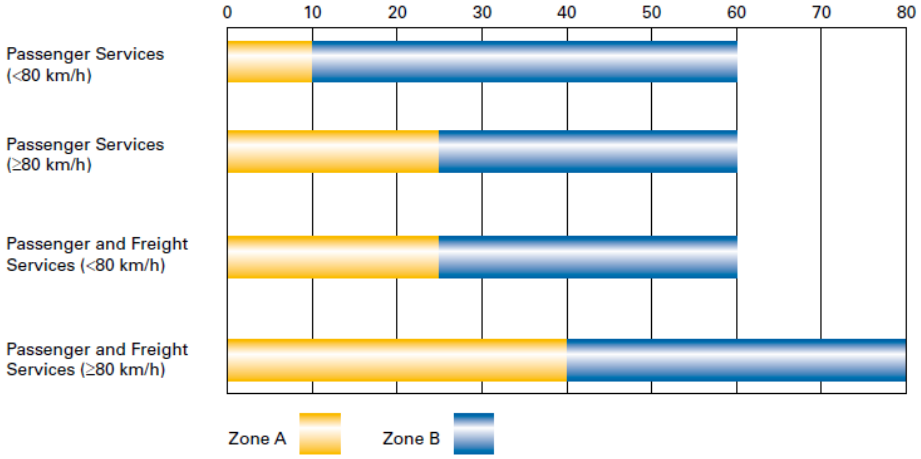


Figure 3.1: Acoustic Assessment Zones based on distance (m) of noise-sensitive development from operational track (not corridor)

The site is in Zone B and Section 3.5.1 of the Interim Guideline states that standard mitigation measures consistent with Road Noise Control Treatment Category 2 are required for this site (Rw windows /sliding doors 27, Rw frontage Façade 45, Rw roof 43 & Rw of entry door 30).

The noise assessment undertaken in this report is in accordance with Section 2.10 of the SEPP (Transport & Infrastructure) 2021. Sections 2.10 replaced 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 2.100 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.

Façade, Roof and other External Building material recommendations will be provided in Section 6.0 of this report to ensure compliance with the above internal amenity criteria.

3.2 AUSTRALIAN/NEW ZEALAND STANDARD AS/NZS 2107:2016

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"*.

This standard provides recommended noise levels for steady state such as noise from building services and quasi-steady state sounds, such as traffic and rail noise. The noise levels recommended in AS/NZS 2107:2016 take into account the function of the area and apply to the sound level measured within the space unoccupied although ready for occupancy.

The standard recommends the following noise levels for residential developments:

Item	Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range	Design reverberation time (T) range, s
7	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	—

3.3 DEPARTMENT OF ENVIRONMENT & CONSERVATION NSW 'ASSESSING VIBRATION: A TECHNICAL GUIDELINE'

In addition to noise limits, floor vibration levels in habitable rooms should comply with the Department of Environment & Conservation NSW document titled *"Assessing Vibration: A Technical Guideline".* Most of these vibration limits stated in the document above are adopted from the British Standard BS 6472-1:2008 "*Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80 Hz)"* criteria.

The acceptable values for intermittent vibration limits within the proposed residence as stated in section 2.4 of the NSW *"Assessing Vibration: A Technical Guideline"* are listed in Table 3.3.1 below.

Table 3.3.1– Acceptable Vibration Dose Values (m/s$^{1.75}$) for Residential Buildings

Location	***Vibration Limit m/s$^{1.75}$***
Residential buildings 16hr day (Daytime)	0.2 to 0.4
Residential buildings 8hr night (Night-time)	0.13 to 0.26

4.0 RAIL VIBRATION MEASUREMENTS AND RESULTS

The floor vibration levels in habitable rooms should comply with the criteria stated in Section 2.3 of this report. Vibration measurements were carried out at Point A using a Vibrock V901 vibration monitor - SN :1574 calibration date: May 2021. The vibration dose, eVDV, for each train pass-by is calculated using the following formula:

$$eVDV = eVDV = 1.4 \times a_{rms} \times t^{0.25}$$

where, a_{rms} = weighted rms acceleration of train (m/s^2); and
t = time taken for the train pass-by

The total vibration for the train pass-by is eVDV (total) = $[N(V_e)^4]^{0.25}$ where N = the number of identical events.

Using the formulas above and the number of train pass-bys (plus 1 freight train for 2 minutes per hour), the eVDV (total) for the day period was found to be 0.085 m/s$^{1.75}$ and

much lower for the nighttime which complies with the NSW document titled *"Assessing Vibration: A Technical Guideline".*

5.0 FAÇADE WEIGHTED SOUND REDUCTION INDEX R_W

The building façade weighted sound reduction index R_w is determined using the following formula:

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

$R_{w=}$ Transmission loss of façade
$L_{(ext)=}$ External Noise level L eq $_{x\ hrs}$.= dB(A) at the façade.
$L_{(int)=}$ Internal Noise level L eq $_{x\ hrs}$.= dB(A) as determined by the noise criteria.
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 :

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

.

External façade building recommendations calculated using above formulas are provided in Section 6.0 below to ensure compliance with the noise criteria stated in sections 2.0 of this.

5.1 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 5.1 below:

Table 5.1 Windows/Sliders, Doors, Walls & Roof Specifications

Building Component	Rw Rating Achieved
Sliding Windows & Sliding Doors in All Bedroom Areas of all Units *facing and the railway corridor (Units 4.5,10,11,16,17,21 &22)* are to be 10.38mm laminated type with full perimeter Schlegel Q-Lon acoustic seals (Ph: 8707-2000). (1)(2)(3) **Sliding Windows & Sliding Doors in all other Living/Dining/Kitchen areas and Bedroom Areas of All Units** are to be 6.38mm laminated type with full perimeter Schlegel Q-Lon acoustic seals (Ph: 8707-2000). (1)(2)(3)	35 32
Windows in all other areas of Units (Bathrooms/Laundries/Staircase etc) are to be 6mm and to be in accordance with AS 2047 (Windows in Buildings). (1)(2)(3)	28
Doors Separating Sole-Occupancy Units from Common Areas are to be Solid Core minimum 42mm thick with acoustic seals fitted around the door. A drop seal is required at the base of the external door. .(2)(3)	>30
External Walls are to be 270/250 mm double brick, brick veneer, hebel, dincel construction or any other method of wall construction with Rw of 50.(2)(3)	50
Roof to be minimum 150mm concrete roof (3).	**50**

NB: This report is to be read in conjunction with the BASIX certificate and any other related building specification.

(1). No See-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 can be applied prior to the application of the foam to seal larger gaps.

(3). All gaps are to be acoustically sealed.

Glazing Notes - Leaks and 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 R_w of 40 will have its acoustic performance dropped to R_w of 30 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, a double-glazing system with R_w of 40 will have its acoustic performance dropped to R_w 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 R_w of 35 will have its acoustic performance dropped to R_w of 29 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, 10.38m mm laminated glazing system with R_w of 35 will have its acoustic performance dropped to R_w 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 R_w of 40, a 10.38m laminated glazing system with Rw of 35, and a 6.38 mm laminated glazing system with R_w of 32 will all attain almost the same R_w 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.

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.

PART 2 – INTERTENANCY NOISE ASSESSMENT

6.0 ACOUSTICAL PRIVACY BETWEEN UNITS (WALLS & FLOORS), SECTION F7 OF THE BCA

Sound isolation between units is mainly determined in accordance with Part F7 - Sound transmission and insulation- of the BCA (Building Code of Australia)/NCC 2022. Part F7 of the BCA nominates laboratory and onsite acoustic performances of various types of walls and floor construction elements adopted by the building industry.

A Building Solution is proposed to comply with the Deemed to Satisfy Provisions if Performance Requirements F7P1 to F7P4 are satisfied by complying with section F7D1 to F7D8 of the BCA/NCC.

An alternative solution to the Deemed To Satisfy Provisions of F7V1 to F7D8 must be determined in accordance with section A0.10 of the BCA (Relative Performance Requirements).

Part F7 - Sound transmission and insulation- of the BCA acts as a protection from any noise annoyance being transmitted between adjoining sole-occupancy units or from some common spaces to sole occupancy units or any other part of a different classifications to sole-occupancy units.

6.1 WALLS & FLOORS BETWEEN ADJACENT OCCUPANCY UNITS

Airborne sound insulation rating of walls is determined using the weighted sound reduction index R_w or weighted sound reduction index with spectrum adaptation terms ($R_w + C_{tr}$) as determined in accordance with AS/NZS 1276.1 or ISO 171.

Proposed Walls separating one sole occupancy unit from another or one sole occupancy unit from a public corridor, staircase, or a plant room will comply with the Deemed to Satisfy Provision in the section F7 of the BCA/NCC provided the following table is satisfied.

Table 6.1 - Building Component between Units –Walls

Building Component between Units- Walls	Attenuation Required.
Living/Bedroom to Living/Bedroom Wet Areas to Wet areas	$R_w + C_{tr} \geq 50$ dB
Kitchen/laundry/Toilet to Living/Bedroom	$R_w + C_{tr} \geq 50$ dB and Discontinuous Construction
Living/Bedroom/Wet Area to Corridor/Stairway/Common Area	$R_w \geq 50$ dB*
Plant Room/ Lift Shaft- Living/Bedroom	$R_w \geq$ 50dB – Discontinuous Construction

Floors separating sole occupancy units (SOU) is to satisfy **all** the following:

- R_{w+ctr} not less than 50
- $L_{n,w}$ not more than 62

All the above is to be satisfied for floors between SOU regardless of whether the floor space is used as a Living/Bedroom or Wet Area

PART 3 – ENVIRONMENTAL IMPACT

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.10-12 Parmal Ave Padstow 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 No.10-12 Parmal Ave Padstow 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)**

7.2 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 the daily/evening/night lowest tenth percentile of L_{90} background noise levels and calculated in accordance with Fact Sheet B of the NPfI 2017.

Therefore, the acceptable L_{eq} noise intrusiveness criterion for broadband noise during the day, evening and night are as follows:

- **Day period:** **40 + 5 = 45 dB(A)**
- **Evening period:** **41 + 5 = 46 dB(A)**
- **Night period:** **36 + 5 = 41 dB(A)**

7.3 PROJECT NOISE TRIGGER LEVEL

A summary of intrusiveness and amenity noise levels as determined in Sections 7.1.1 & 7.2.1 are shown in Table 7.3.1 below:

Table 7.3.1 - 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)	45	58

Evening Time (6:00pm-10:00pm)	46	48
Night & Early Morning (10:00pm – 7:00am)	41	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 $L_{Aeq,15\ min}$: **45** dB(A)
- Evening period $L_{Aeq,15\ min}$: **46** dB(A)
- Night period $L_{Aeq,15\ min}$: **41** dB(A)

The proposed developments and its activities including all mechanical plant and carpark activities will not exceed the project noise trigger level at the most sensitive location, provided all noise control recommendations in Section 8.0 are adhered to.

7.4 NOISE IMPACT OF MECHANICAL PLANT & EQUIPMENT

A range of mechanical plants, equipment and ventilation will be included in the proposed development at No. No.10-12 Parmal Ave Padstow. Noise emitted by the use of the proposed mechanical plant is assessed by the Noise Policy for Industry 2017 and Canterbury Bankstown Council requirements.

The proposed level of basement parking is 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 7.4.1

Table 7.4.1 – 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	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 7.0 of this report are adhered to.

8.0 RECOMMENDATIONS

The recommendations listed in Table 8.1 below are essential for the noise break-out from the proposed development to comply with section 7.0 of this report.

Table 8.1– Typical Mechanical Plant Recommendations

Item	RECOMMENDATIONS
Basement Roller Door	• Ensure maintenance and lubrication of motor bearings, door tracks and joints. • 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: ○ Procurement of quiet plant (when required) and the maintenance of existing plant.

	○ Strategic positioning of plant away from potential sensitive receivers. ○ Commercially available silencers or acoustic attenuators for air discharge and air intakes of plant. ○ Acoustically lined and lagged ductwork. ○ Acoustic screens and barriers between plant and sensitive neighboring premises; and/or, ○ Partially enclosed or fully enclosed acoustic enclosures around plant.

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.

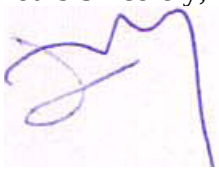
9.0 DISCUSSION AND CONCLUSION

The construction of the proposed development at No.10-12 Parmal Ave Padstow, if carried out as recommended in the plans and specifications and including the acoustic recommendations in this report, will meet the requirements of Clause 87 of the State Environmental Planning Policy – (Infrastructure) 2007, AS 2107:2016 *'Acoustics – Recommended Design Sound Levels and Reverberation Times'*, and Canterbury Bankstown Council requirements.

Noise break-out from the proposed development, including operation of all proposed mechanical plant & equipment; will comply with the requirements of the NSW Noise Policy for Industry (2017) and Canterbury Bankstown Council requirements, provided recommendations in Section 7 of this report are adhered to.

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

Yours Sincerely,



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10.0APPENDIX

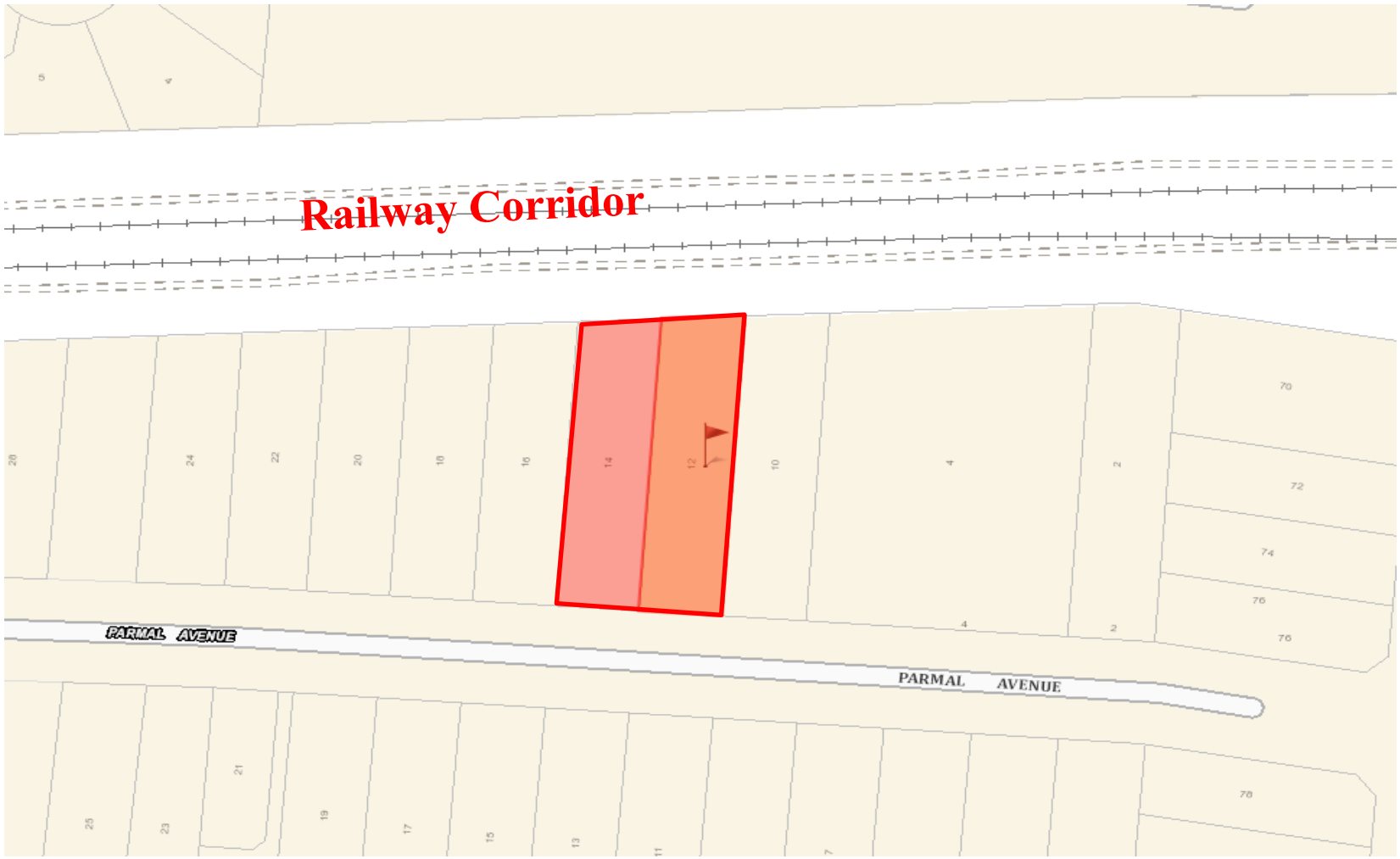

Figure 1 - Site Location

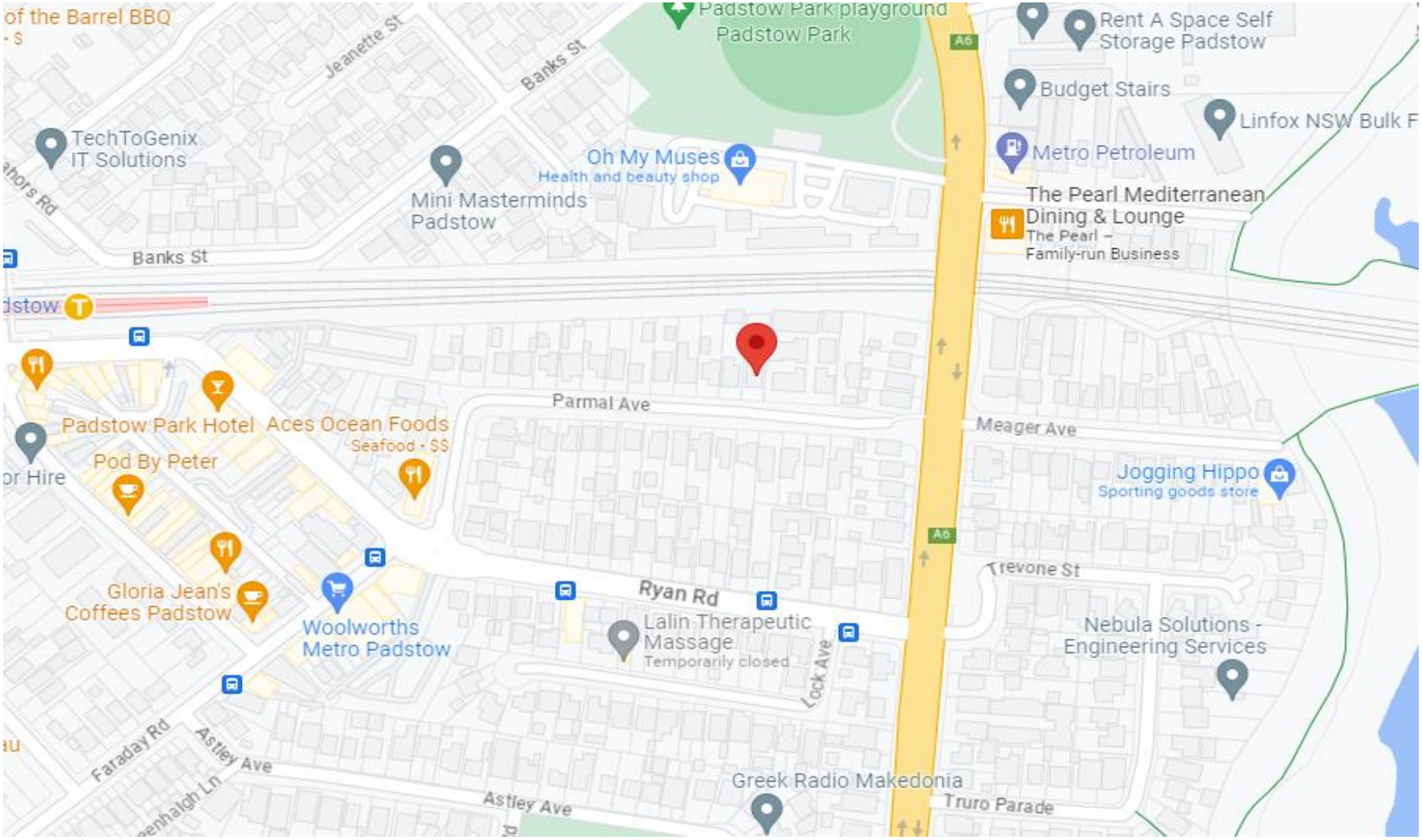

Figure 2 – Surrounding Environment

Figure 3 – Noise & Vibration Reading Location (Point A)

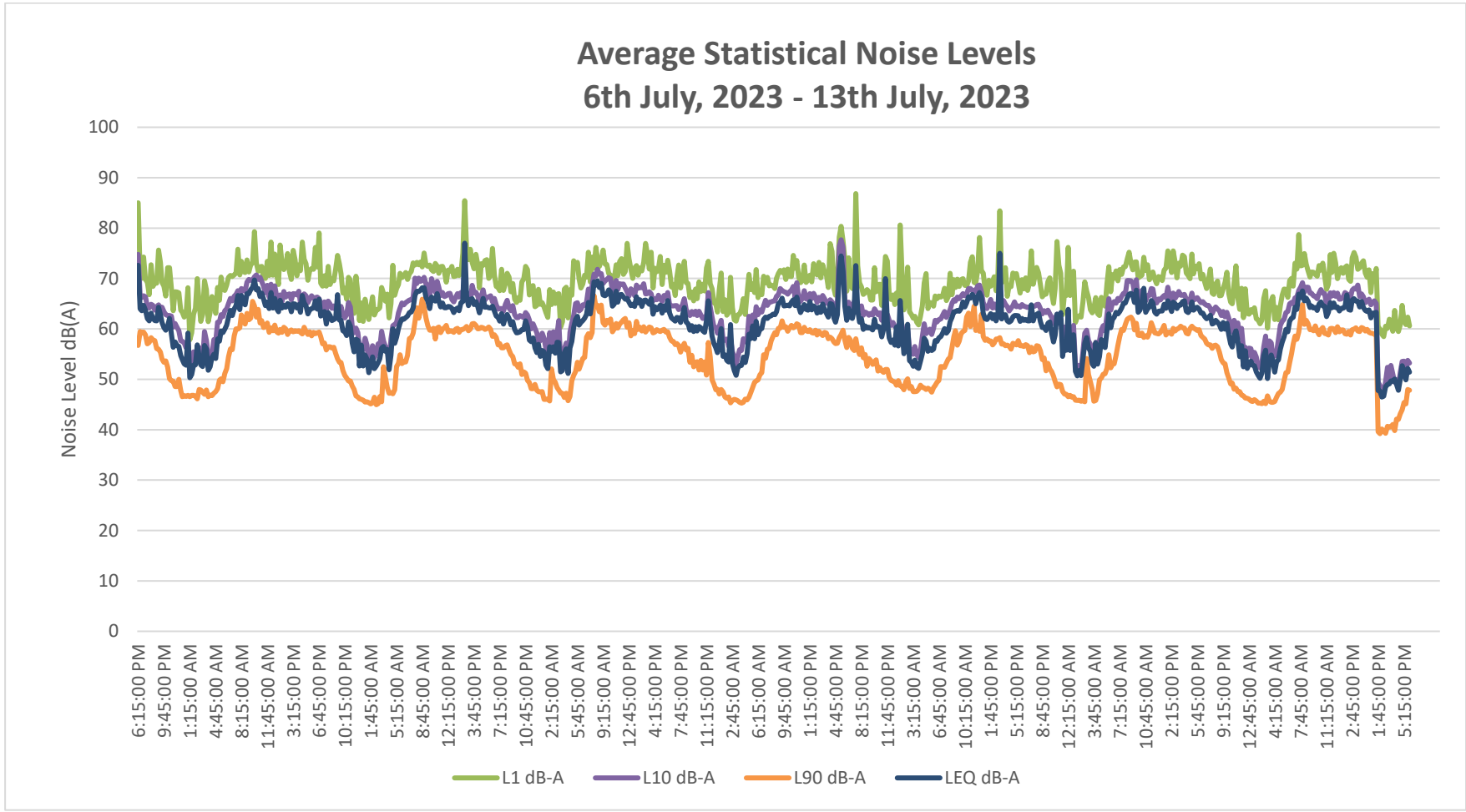

Figure 4 - Noise Survey Point A