Retire Australia - Lot 101 Yeronga

Development Application Acoustic Report

22/07/2025

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PREPARED FOR:

Retire Australia

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Revision Schedule

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1. Introduction

Stantec Australia Pty Ltd (Stantec) have been engaged by Retire Australia (RA) to undertake a noise impact assessment for the development application stage (DA) of the Retire Australia– Lot 101 Yeronga project. The project site is located at 70 Park Rd (Lot 1 on SP328496), Yeronga QLD 4104 and is within the Brisbane City Council (BCC).

The primary purpose of conducting acoustic assessment has been to determine noise impacts on the completed project from the rail corridor and, subsequently, determine appropriate treatments which endeavour to protect the acoustic amenity of prospective occupants.

This acoustic services report:

- Defines understanding of the existing site and proposed uses of the buildings, as well as the acoustic quality standards for the project;
- Establishes criteria pertinent to the following acoustic parameters:
    - External noise intrusion / internal noise levels;
    - Environmental noise emissions;
- Provides design recommendations for the abovementioned parameters for various spaces based on the applicable design guidelines discussed in this report;

Each of the acoustical aspects identified have been addressed in this report and recommendations are made to provide a consistent acoustical outcome for the project.

A glossary of terms used in this report is provided in **Appendix A**.

The recommendations made in this report are specific to the building design at the date of issue of this report. The building design is subject to change during the following stages. Where this occurs, the assumptions made to inform the recommendations in the report may no longer be valid; therefore, further advice should be sought to ensure that the acoustic outcomes presented in this report are achieved.

The performance of products referred to in this report are made to meet the acoustic requirements only. It does not consider other aspects, including but not limited to thermal, wind, impact, structural, mechanical, national construction code, security and fire requirements. Relevant discipline reports, drawings and specifications should be referred to for conformance.

This report relates to this specific project and must not be applied to any other project without prior consultation with Stantec. Designs and conditions can vary between projects causing significant variations in acoustic performance and relevant subsequent advice to one project may not apply to another.

This report shall not be relied upon as providing any warranties or guarantees of construction quality regarding acoustics.

2. Background

2.1 Regulations, Policies, Standards and Guidelines

The following documents detailed in **Table 1** are relevant to the project and are referred to throughout this report.

Table 1: Applicable Regulations, Policies, Standards and Guidelines referenced in this report

Title	Abbreviation
STATE LEGISLATION AND LOCAL COUNCIL POLICIES	
Queensland Environmental Protection Act 1994	EPA 1994
Queensland Environmental Protection (Noise) Policy 2019	EPP 2019
Yeronga Priority Development Area - Development Scheme published by the Department of State Development, Manufacturing, Infrastructure and Planning August 2019	YDS
Brisbane City Council – City Plan 2014	BCC 2014
Queensland Development Code Mandatory Part 4.4 – *Buildings in a Transport Noise Corridor* Version 1.1 (published 17 August 2015 from Department of Housing and Public Works)	QDC MP4.4
AUSTRALIAN AND INTERNATIONAL STANDARDS	
Australian Standard AS 1055:2018 *Acoustics – Description and measurement of environmental noise*	AS 1055
International Standards Organization 9613-2:2014 *Attenuation of sound during propagation outdoors – Part 2: General method of calculation*	ISO 9613
GUIDELINES	
Department of Transport and Main Roads – *Operational Railway Noise and Vibration Interim Guideline*	TMR Guide

2.2 Study Inputs

Acoustic assessment and the preparation of this report have been conducted based on the received documentation detailed in **Table 2**.

Table 2: Received documentation

Date Received	Detail	Revision / Date Prepared	Prepared By	Format
11/07/2025	Architectural DA drawings package refer to drawing list: • *MP-AR-DWG-A1.02_B*	11/07/2025	Marchese Partners	pdf

3. Project Overview

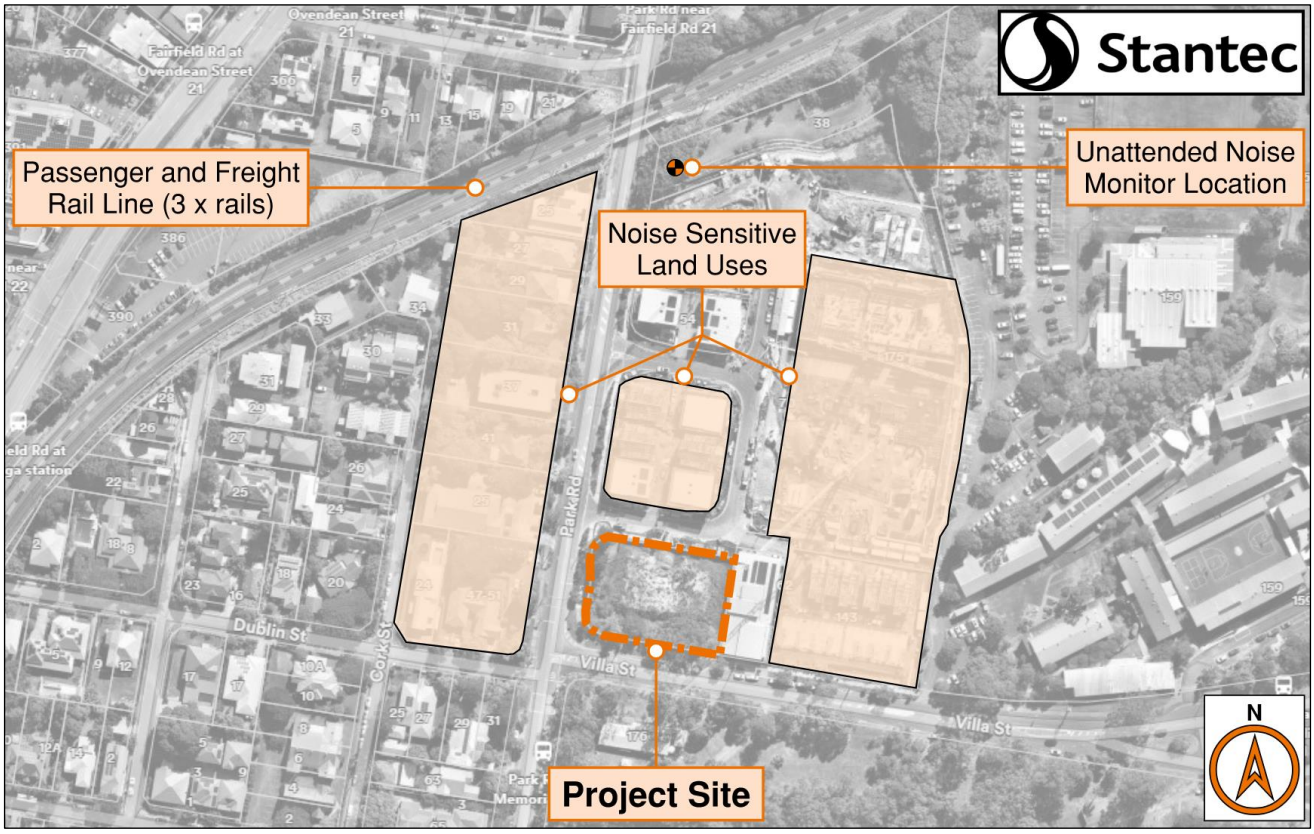
3.1 Site Description

3.1.1 Project Location

The project site is located at 70 Park Rd (Lot 1 on SP328496), Yeronga QLD 4104 and is within the Brisbane City Council (BCC). The site is exposed to noise emissions from passenger and freight rail transportation lines situated to the north of the site. The railway line is a primary passenger connection route between Gold Coast, Logan and Brisbane council regions.

The project site has been shown in context with the rail line existing surrounding developments and noise monitoring locations (conducted by Stantec and discussed in **Section 3.3**) in **Figure 1**.

Figure 1: Project site and noise monitoring location



Source: Nearmap (image dated 08/05/2025, accessed 23/06/2025)

3.1.2 Surrounding Land Uses / Zoning

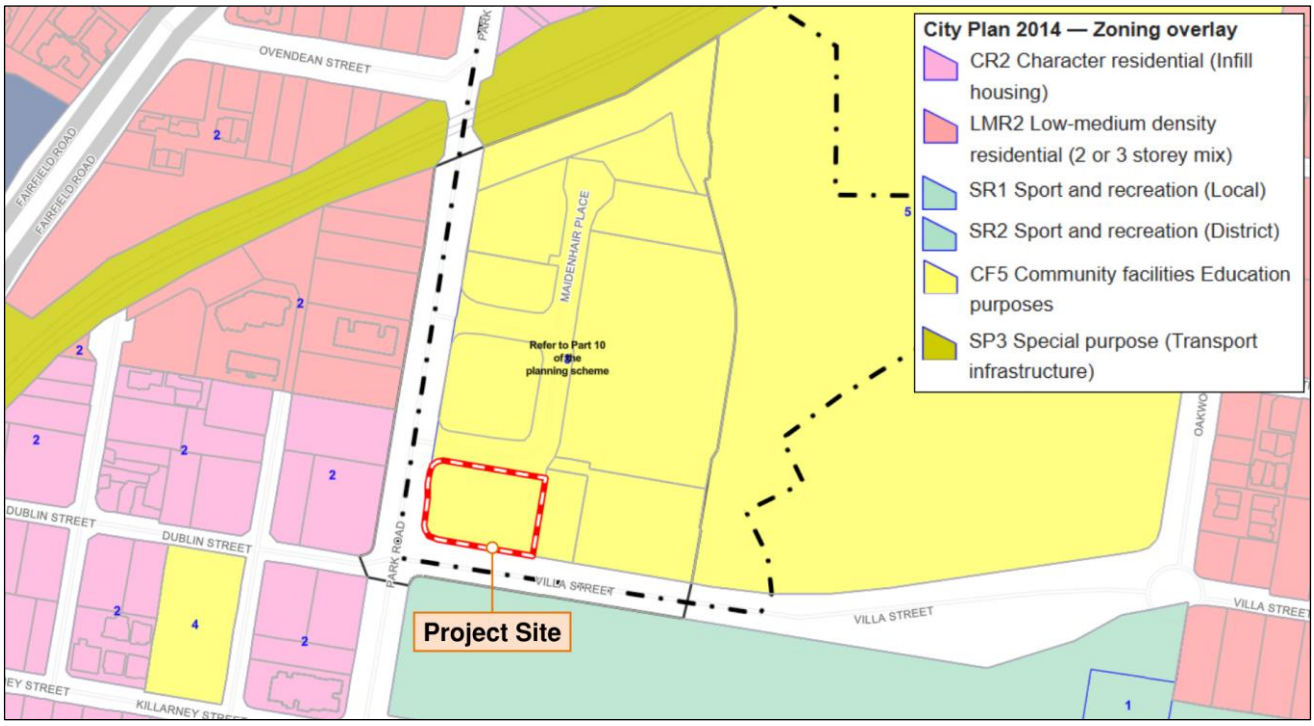
The Brisbane City Council interactive mapping (link) was reviewed to determine zoning of the site and surrounding lots (see **Figure 2**) The following was identified:

- The project site is:
    - situated within Yeronga Priority Development Area (PDA) – Development Scheme and Dutton Park-Fairfield neighbourhood plan zone;
    - currently zoned CF5 Community facilities (Education purposes) by the BCC City Plan;
- Existing land uses surrounding the project site generally consist of the following zoning;

- LMR2 Low-medium density residential (2 or 3 storey mix);
- CR2 Character (Infill housing);
- CF5 Community facilities (Education purposes);
- SP3 Special purpose (Transport infrastructure)
- SR1 Sport and recreation (Local);
- SR2 Sport and recreation (District);

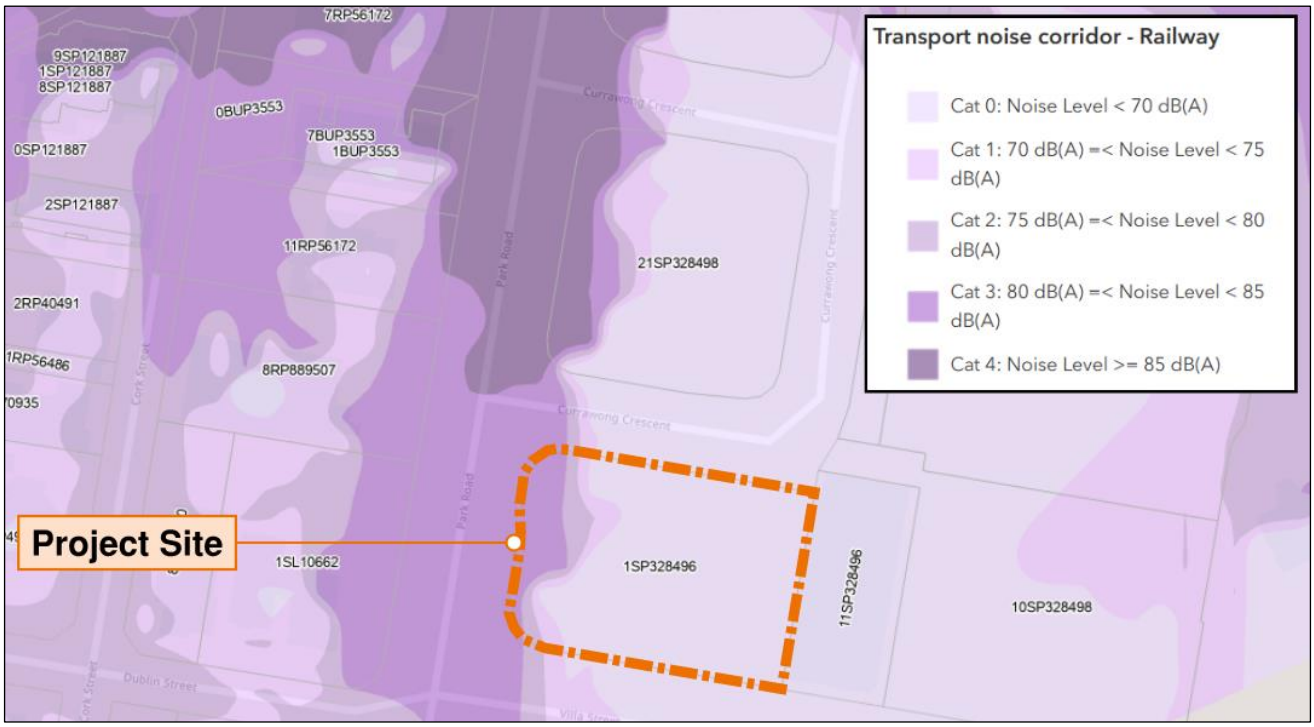
- The nearest noise sensitive receptors to the project site are located at:
  - North: 8 Currawong Crescent, Yeronga 4104;
  - East: 9 Currawong Crescent, Yeronga 4104; and
  - West: 25 – 51 Park Road, Yeronga 4104.
- The proposed development is located within;
  - State designated noise corridor - rail network up to Category 3: 80 dB(A) - 85 dB(A) (see **Figure 3**).
- The proposed development is not located within;
  - 25m of a State transport corridor or 100m of a State-controlled road intersection (see **Figure 4)**
  - Aircraft Noise Exposure Forecast (ANEF) contours;
  - Transport Noise Corridors – State-controlled Roads (mandatory) contours; or
  - Transport Noise Corridors – State-controlled Roads (voluntary).

Figure 2: Land use / zoning surrounding the project site



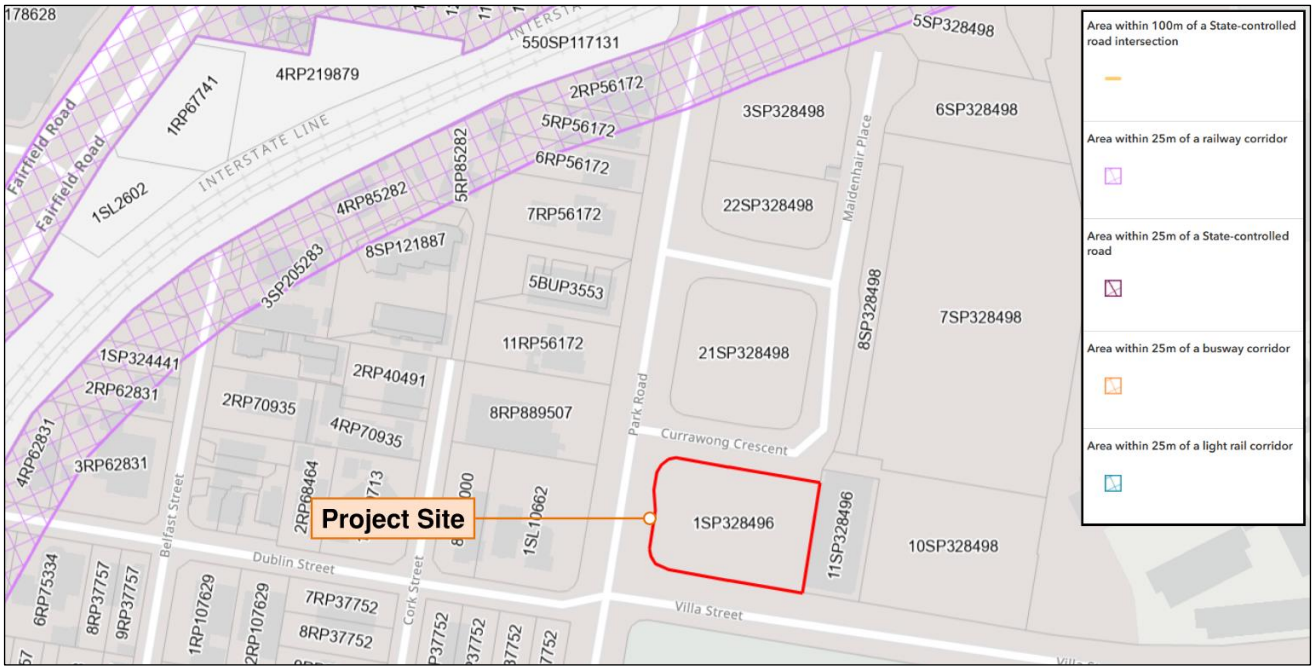
Source: BCC City Plan 2014 (link) | Map Layers – Zones | Annotations by Stantec

Figure 3: Project location shown in context with Transport noise corridor – Rail network



Source: QLD Government State Planning Policy Interactive Mapping (accessed 23/06/2025) | Annotations by Stantec

Figure 4: Project location shown in context with State transport corridors and intersections



Source: QLD Government Development Assessment Mapping System Interactive Mapping (accessed 23/06/2025) | Annotations by Stantec

3.2 Proposed Development

The proposal is for a Retirement Facility (58 Independent living units); Care co-located uses, comprising less than 250m^2 of cumulative gross floor area (Care co-located uses include Club, Community Care Centre, Community Use, Food and Drink Outlet, Health Care Service, Office and Shop); Sales Office (Display Unit) greater than 30m^2 of gross floor area.

Based on the architectural documentation received (refer to **Table 2**) the project will include:

- Carparking across 3 basement levels
- Sole occupancy units (SOU's) from the upper ground floor to level 8
- AC and hot water plant deck on Level 5 (west side)
- Communal area on the lower ground floor
- AC plant spaces from upper ground to level 8 on the north side of the development.
- Rooftop plant areas

3.3 Existing Acoustic Environment

3.3.1 Unattended Noise Measurement Method

To quantify the existing noise environment around the site and degree of exposure to noise associated with rail transport, unattended noise monitoring (noise logging) was conducted from Friday 23rd April 2021 to Friday 30th April 2021 (inclusive). The location of the noise monitoring location has been shown in **Figure 1**. Updated noise monitoring at the site was not possible due to construction works currently being undertaken nearby. While the noise monitoring data is a few years old it is not considered an issue as:

- The measured background levels are likely lower than current noise levels due to the additional developments in the area resulting in conservative noise emission assessment limits; and
- L_{Amax} noise levels from rail are expected to remain the same.

Noise measurements were conducted following guidance from Australian Standard AS 1055:2018 – *Acoustics – Description and measurement of environmental noise*, and the instruments were configured as follows:

- A-weighting frequency response;
- FAST time response; and
- 15-minute, 1 minute and 1 second intervals.

The sound level meter was calibrated before and after the measurement period. The instrument showed a drift less than ±1 dB during the course of monitoring; therefore, measurements are considered valid according to AS 1055:2018. Complete details and full measured results, refer to the details presented in **Appendix B**.

3.3.2 Site Averaged Noise Levels

A summary of the relevant average unattended noise levels recorded at each measurement location from Friday 23rd April 2021 to Friday 30th April 2021 (inclusive) presented in **Table 3**. For further details and full measured results, refer to **Appendix B**.

Table 3: Summary of relevant noise descriptors used to determine noise limits and inform acoustic assessment

Equivalent Continuous Noise Level, L_{eq} dB(A)			Rating Background Level, RBL dB(A)			Background Noise Level, $L_{90,T}$ dB(A)		
Day [1)]	Evening [1)]	Night [1)]	Day	Evening	Night	Day	Evening	Night
62	61	58	45	45	35	45	49	38

NOTES:

1) Day – 7am-6pm | Evening – 6pm-10am | Night – 10pm-7am

3.3.3 Railway Noise Levels

In addition to establishing the general acoustic profile at the project site, the purpose of unattended noise monitoring was to quantify noise levels associated with rail transport service. According to the Queensland Rail Code of Practice – Railway Noise Management;

> *"The Single Event Maximum Level provides a way to account for the potential disturbance based on peak maximum levels. Typically, on rail lines through urban areas, the Single Event Maximum Level is determined from highest 15 peak maximum levels over a 24-hour period."*

The measured data and captured audio files (described in Appendix B) was processed and analysed for each 24-hour period. **Table 4** provides a summary of the 15 worst-case peak maximum levels recorded over a 24-hour period on Saturday, April 24, 2021, along with the calculated single event maximum noise level and the $L_{Aeq,24hr}$.

Table 4: Calculation of single event maximum noise level (SEM) 24-hour period (measured Saturday 24th April 2021)

Time	Train Type	Measurement Distance (m)	Measured Level L_{max} dB(A)
12:03:58	Passenger Train 1	24	85
18:35:13	Passenger Train 2		84.8
20:51:10	Passenger Train 3		83.9
11:51:43	Passenger Train 4		83.8
16:21:32	Passenger Train 5		83.2
21:04:10	Passenger Train 6		83.1
9:43:50	Passenger Train 7		82
9:44:45	Freight Train 1		81.9
14:21:03	Passenger Train 8		81.9
18:45:36	Passenger Train 9		81.8
16:35:05	Passenger Train 10		81.7
15:41:40	Passenger Train 11		81.3
14:21:04	Passenger Train 8		81.1
18:39:23	Freight Train 2		80.2
21:09:02	Freight Train 3		80
Single event maximum noise level (SEM)			**82.4**
$L_{eq,24hour}$ dB(A)			**59.8**

3.4 Acoustic Design Issues and Considerations

The following items are to be considered for the project:

- The proposed development is located within rail network transport noise corridor overlays (see **Figure 3**). Therefore, noise impacts are to be assessed in accordance with SDAP and the Queensland Development Code MP 4.4.
- The development provides resident carparks underground in basement levels 1 – 3. Noise from carparking activities will be contained within the basements, therefore, were not assessed further.
- Noise emissions from any mechanical plant proposed for the project will need to comply with the criteria outlined by the BCC City Plan (where applicable), EPA 1994 and EPP 2019.

4. Acoustic Criteria

4.1 Yeronga PDA – Development Scheme

Acoustic Requirements

The Yeronga Priority Development Area – Development Scheme (Yeronga PDA DS) prepared by the Economic Development Queensland (EDQ) outlines a single requirement regarding noise intrusion on the site within ***Section 2.5.6 Community safety and development constraints***:

> *The siting, design, construction and operation of development supports community safety and gives appropriate consideration to development constraints by:*
>
> *3. avoiding, to the greatest extent practicable, then managing or mitigating significant adverse impacts:*
>
> *b. from noise emissions on sensitive uses [41], including those from transport noise corridors (in this section, note 41 of the scheme states "**for guidance on acoustic amenity, refer to the Brisbane City Plan Centre or mixed-use code**"), and*
> *c. on the environment.*

Relationship with Brisbane City Plan 2014

Schedule 6 of the Planning Regulation 2017 (Planning Regulation) prohibits Brisbane City Plan 2014 from making PDA-related development assessable under the Planning Act. However, schedule 2 adopts definitions from Brisbane City Plan 2014 and the development scheme calls up various other parts of the Brisbane City Plan 2014 as guidance.

Under section 71 of the ED Act, if there is a conflict between the development scheme and a planning instrument, or assessment benchmarks prescribed by regulation under the Planning Act or another Act for the Planning Act, the development scheme prevails to the extent of any inconsistency.

4.2 Environmental Noise Emissions

4.2.1 Brisbane City Council – City Plan 2014

The Brisbane City Council – City Plan 2014 requires developments to be designed to maintain the expected level of amenity for the area where they are constructed.

In accordance with Section 3b of the Yeronga PDA DS, guidance on acoustic amenity shall be sought from the Brisbane City Plan when assessing noise emissions from the project site to external sensitive uses, specifically, the centre or mixed-use code. A summary of the acoustic-related performance and acceptable outcomes defined under the 9.3.3 Centre or mixed-use code have been provided in **Table 5**.

Table 5: Performance outcomes and acceptable outcomes (BCC City Plan, Table 9.3.3.3.A)

Performance outcomes	Acceptable outcomes
PO1 Development: a. has hours of operation which are controlled so that the use does not detrimentally impact on the amenity of adjoining residents; b. does not result in noise emissions that exceed the noise (planning) criteria in Table 9.3.3.3.F, low frequency noise criteria in Table 9.3.3.3.G and night-time noise criteria in Table 9.3.3.3.H in a sensitive zone or a nearby sensitive use, except music noise where located in a Special entertainment precinct identified in a neighbourhood plan. Note—A noise impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	**AO1.1** Development: a. for accommodation activities, dwelling unit or emergency services has unlimited hours of operation; b. for a club, if licensed, bar, function facility, hotel or nightclub entertainment facility does not generate noise which is clearly audible and detectable, or impacts on the amenity of a resident, in a dwelling or other sensitive use; Note—Development for a club, if licensed, bar, function facility, hotel or nightclub entertainment facility is not expected to achieve this outcome. c. for any other use: i. where in the Principal centre zone or Major centre zone has unlimited hours of operation; ii. where in the District centre zone, Neighbourhood centre zone or Mixed use zone:

Performance outcomes	Acceptable outcomes
	A. has hours of operation, including for deliveries, which are limited to 6am to 10pm; or B. does not generate noise which is clearly audible and disturbing in a dwelling or other sensitive use; iii. where in any other zone: A. has hours of operation, including for deliveries, which are limited to 6am to 8pm; or B. does not generate noise which is clearly audible and disturbing in a dwelling or other sensitive use.
	AO1.2 Development ensures mechanical plant or equipment is acoustically screened from an adjoining sensitive use. Note—Mechanical plant includes generators, motors, compressors and pumps e.g. air-conditioning, refrigeration or cold room motors

Noise (planning) criteria

The applicable noise planning criteria from the *centre or mixed-use zone code* (Table 9.3.3.3.F) has been reproduced in **Table 6**.

Table 6: Noise (planning) criteria (Table 9.3.3.3.F, City Plan 2014)

Criteria Location	Intrusive Noise Criteria	Acoustic Amenity Criteria		
	Day, evening and night $L_{Aeq,adj,T}$ [1] are not greater than the RBL [2] plus the value in this column for the relevant criteria location, where T equals: • day – 11hr • evening – 4hr • night – 9hr	Day, evening and night $L_{Aeq,adj,T}$ [1] are not greater than the values in the columns below for the relevant criteria location, where T equals: • day – 11hr • evening – 4hr • night – 9hr		
		Day	**Evening**	**Night**
Low–medium density residential zone boundary	3 dB(A)	55 dB(A)	45 dB(A)	40 dB(A)
Character residential zone boundary	3 dB(A)	55 dB(A)	45 dB(A)	40 dB(A)
At a sensitive use in the mixed-use zone	5 dB(A)	60 dB(A)	55 dB(A)	50 dB(A)

Notes:

1) $L_{Aeq,adj,T}$: The adjusted A-weighted equivalent continuous sound pressure level of the development during the time period T, where T is an 11-hour day (7am–6pm), 4-hour evening (6pm–10pm) and 9-hour night (10pm–7am), determined in accordance with the methodology in the Noise impact assessment planning scheme policy.

2) RBL: Rating background level determined in accordance with the methodology in the Noise impact assessment planning scheme policy.

Low frequency noise criteria

Low frequency noise emissions from the proposed development shall comply with the acoustic performance criteria outlined in **Table 7**.

Table 7: Low frequency noise criteria (Table 9.3.3.3.G, City Plan 2014)

Criteria location	Day (7am-6pm) $L_{Ceq,adj,11hr}$ [1] is not greater than the following values at the relevant criteria location	Evening (6pm-10pm) $L_{Ceq,adj,4hr}$ [1] is not greater than the following values at the relevant criteria location	Night (10pm-7am) $L_{Ceq,adj,9hr}$ [1] is not greater than the following values at the relevant criteria location
Low-medium density residential zone boundary Character residential zone boundary	65 dB(C)	65 dB(C)	60 dB(C)
At a sensitive use in the mixed-use zone	75 dB(C)	75 dB(C)	70 dB(C)

Notes:

1) $L_{Ceq,adj,T}$: The adjusted C-weighted equivalent continuous sound pressure level of the development during the time period T, where T is an 11-hour day (7am–6pm), 4-hour evening (6pm–10pm) and 9-hour night (10pm–7am), determined in accordance with the methodology in the Noise impact assessment planning scheme policy.

Night-time noise criteria

The relevant night-time noise criteria outlined by *Table 9.3.3.3.H* of the City Plan 2014 has been reproduced in **Table 8**.

Table 8: Night-time noise criteria (Table 9.3.3.3.H, City Plan 2014)

Criteria location	Where the existing $L_{Aeq,9hr}$ [1] $_{night}$ at the criteria location is:	Average of the highest 15 single L_{Amax} [2] events over a given night (10pm–7am) period is not greater than the following values at the relevant criteria location	The absolute highest single L_{Amax} [2] event over a given night (10pm–7am) period is not greater than the following values at the relevant criteria location
Low-medium density residential zone boundary Character residential zone boundary	< 45 dB(A)	50 dB(A)	55 dB(A)
	45 to 60 dB(A)	$L_{Aeq,9hr\ night}$ + 5 dB(A)	$L_{Aeq,9hr\ night}$ + 10 dB(A)
	> 60 dB(A)	65 dB(A)	70 dB(A)
Mixed use zone	Not applicable	65 dB(A)	70 dB(A)

Notes:

1) $L_{Aeq,9hr}$: The A-weighted equivalent continuous sound pressure level of the development during the night- time period 10pm to 7am, determined in accordance with the methodology in the Noise impact assessment planning scheme policy.

2) L_{Amax}: The A-weighted maximum sound pressure level determined in accordance with the methodology in the Noise impact assessment planning scheme policy.

4.2.2 Queensland Environmental Protection Act 1994

The objective of the Queensland Environmental Protection Act 1994 (EPA 1994) is *"to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends."*

To uphold this intent, and of relevance to acoustic assessment for the project, the EPA 1994 defines a series of noise-related standards in Chapter 8, Part 3B Offences relating to noise standards. The following sections are considered applicable:

Section 440R Building work

(1) A person must not carry out building work in a way that makes an audible noise—
(a) on a business day or Saturday, before 6.30a.m. or after 6.30p.m; or
(b) on any other day, at any time.
(2) The reference in subsection (1) to a person carrying out building work—

(a) includes a person carrying out building work under an owner-builder permit; and
(b) otherwise does not include a person carrying out building work at premises used by the person only for residential purposes.

Section 440V Refrigeration equipment

(1) This section applies to a person who is—
(a) an occupier of premises at or for which there is plant or equipment for refrigeration (refrigeration equipment); or
(b) an owner of refrigeration equipment that is on or in a vehicle, other than a vehicle used or to be used on a railway.
(2) The person must not use, or permit the use of, the refrigeration equipment on any day—
(a) before 7a.m, if it makes a noise of more than 3dB(A) above the background level; or
(b) from 7a.m. to 10p.m, if it makes a noise of more than 5dB(A) above the background level; or
(c) after 10p.m, if it makes a noise of more than 3dB(A) above the background level.
(3) In this section—
*(2) **vehicle** includes a trailer.*

Section 440U Air-conditioning equipment

(1) This section applies to premises at or for which there is air-conditioning equipment.
(2) An occupier of the premises must not use, or permit the use of, the equipment on any day:
(a) before 7am, if it makes a noise of more than 3dB(A) above the background level [1]; or
(b) from 7am to 10pm, if it makes a noise of more than 5dB(A) above the background level; or
(c) after 10pm, if it makes a noise of more than 3dB(A) above the background level.

4.2.3 Environmental Protection (Noise) Policy 2019

The Queensland Environmental Protection (Noise) Policy 2019 (EPP 2019) identifies environmental values to be enhanced or protected, states acoustic quality objectives, and provides a framework for making decisions about the acoustic environment.

Schedule 1 Acoustic Quality Objectives

The acoustic quality objectives are stated in Section 7 of Schedule 1 of the EPP 2019. In accordance with EPP 2019, the acoustic quality objectives are stated for a defined type of noise sensitive use and specified period of the day (reproduced in **Table 9**). The environmental values which EPP 2019 aims to enhance or protect are also stated. It is intended that the acoustic quality objectives be progressively achieved as part of achieving the purpose of EPP 2019 over the long term.

Table 9: Acoustic quality objectives as defined in Schedule 1 of the EPP 2019

Sensitive Receptor	Time of Day	Acoustic Quality Objectives [1)] (measured at the receptor) dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
residence (for outdoors)	daytime and evening	50	55	65	health and wellbeing
residence (for indoors)	daytime and evening	35	40	45	health and wellbeing
	night-time	30	35	40	health and wellbeing, in relation to the ability to sleep
library and educational institution (including a	when open for business or when classes are being offered	35	—	—	health and wellbeing

[1] *NOTE: According to the EPA 1994:*
- *Background level means the background A-weighted sound pressure level under the prescribed standard measured as $L_{A90,T}$.*
- *$L_{A90,T}$ means the A-weighted sound pressure level obtained using time weighting 'F' that is exceeded for 90% of the measuring period (T).*

Sensitive Receptor	Time of Day	Acoustic Quality Objectives [1] (measured at the receptor) dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
school, college and university) (for indoors)					
school or playground (for outdoors)	when the children usually play outside	55	—	—	health and wellbeing, and community amenity

Notes:

1) The $L_{Aeq,Adj,T}$ noise limits apply to all noise sources, whilst the $L_{A10,Adj,1hr}$ and $L_{A1,Adj,1hr}$ only apply to intermittent noise sources (i.e. excludes air conditioning).

4.3 External Noise Intrusion

4.3.1 State Development Assessment Provisions v3.2

The State Development Assessment Provisions v3.2 (SDAP) defines the state's interest in development assessment in the proximity to infrastructure. Within SDAP, *State Code 2: Development in a railway environment* (SDAP SC2) details the specific requirements for the assessment of railway noise in *Table 2.4: Environmental emissions*.

The relevant performance and acceptable outcomes are reproduced from the SDAP SC2 in **Table 10**.

Table 10: Performance and acceptable outcomes (reproduced from Table 2.4 of SDAP SC2)

Performance Outcomes	Acceptable Outcomes
Material change of use (accommodation activity)	
Ground floor level requirements adjacent to a railway or type 2 multi-modal corridor	
PO41 Development minimises noise intrusion from a **railway** in **private open space** at the ground floor.	**AO41.1** Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum free field acoustic levels in reference table 2 (item 2.2) for **private open space** at the ground floor level; 2. in accordance with: a. Civil Engineering Standard Specification QR CTS-Part 41 – Part 41, Design and Construction of Noise Fences/Barriers, Queensland Rail, 2018; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO41.2** Development achieves the maximum free field acoustic level in reference table 2 (item 2.2) for **private open space** at the ground floor level by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.
PO42 Development (excluding a **relevant residential building** or **relocated building**) minimises noise intrusion from the **railway** in **habitable rooms** at the facade of the ground floor level.	**AO42.1** Development (excluding a **relevant residential building** or **relocated building**) provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum building facade acoustic level in reference table 1 (item 1.1) for **habitable rooms** at the ground floor level; 2. in accordance with: a. Civil Engineering Standard Specification QR-CTS-Part 41 – Part 41, Design and Construction of Noise Fences/Barriers, Queensland Rail, 2018; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO42.2** Development (excluding a **relevant residential building** or **relocated building**) achieves the maximum building facade acoustic level in reference table 1 (item 1.1) for **habitable rooms** at the ground floor level by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.

Performance Outcomes	Acceptable Outcomes
PO43 Habitable rooms (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in Table 3 (item 3.1).	No acceptable outcome is prescribed.
Above ground floor level requirements (accommodation activity) adjacent to a railway or type 2 multi-modal corridor	
PO44 Balconies, podiums and roof decks include: 1. a continuous **solid gap-free structure** or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); 2. highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums and roof decks	No acceptable outcome is prescribed.
PO45 Habitable rooms (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1)	No acceptable outcome is prescribed.

Table 11: Maximum building facade acoustic levels (Table 1 – SDAP SC2)

Applicable use	Acoustic levels
1.1: Accommodation activity	a. ≤ 65 dB(A) Leq (24 hour) facade corrected AND b. ≤ 87 dB(A) (single event maximum sound pressure level) facade corrected

Table 12: Maximum free field acoustic levels (Table 2 – SDAP SC2)

Applicable use	Acoustic levels
2.2: Private open space for an **accommodation activity** (including lots created for a **future accommodation activity**)	a. ≤ 62 dB(A) Leq (24 hour) free field OR b. ≤ 84 dB(A) (single event maximum sound pressure level) free field

Table 13: Maximum internal acoustic levels (Table 3 – SDAP SC1)

Applicable use	Acoustic levels
3.1: Habitable rooms in **an accommodation activity** (excluding uses addressed in QDC MP4.4)	≤45 dB(A) single event maximum sound pressure level

4.3.2 Queensland Development Code Mandatory Part 4.4

Queensland Development Code Mandatory Part 4.4 (QDC MP4.4) was introduced 31st August 2010 and updated 17th August 2015 in conjunction with planning policy requirements which define planning overlay areas affected by transportation noise as “Transport Noise Corridors”.

The purpose of the Code is to ensure habitable rooms of particular residential buildings located in transport noise corridors are designed and constructed to reduce the extent to which transport noise intrudes into those rooms. The Code applies to any building work on certain residential buildings which are subject to a building development application.

The Code applies to residential buildings if it:

i. is class 1, 2, 3 or 4 building; and

ii. is located in a transport noise corridor; and

iii. is not a relocated building; and

iv. building application is made after release of the Code

The Code requires that each external facade of a habitable room be assigned a noise category:

i. which is dependent upon the future noise exposure at the façade presented in mapping of Transport Noise Corridor; or

ii. as defined by a detailed transportation noise assessment (undertaken in accordance with the requirements of Schedule 3 of the Code). The objective of the noise assessment is to clearly demonstrate the noise category that is applicable to a particular part of a building, or site.

The applicable criteria for determining the relevant noise category are reproduced from the Code and provided in **Table 14**.

Table 14: MP 4.4 Noise Category levels

Noise Category	Single event maximum noise (L_{Amax}) for railway land [1)]
Category 4	≥ 85 dB(A)
Category 3	80 – 84 dB(A)
Category 2	75 – 79 dB(A)
Category 1	70 - 74 dB(A)
Category 0	≤ 69 dB(A)

Notes:

1) Measured at 1 m from the façade of the proposed building.

5. Noise Impact Assessment

5.1 Rail Noise Intrusion

5.1.1 Assessment Overview

This section presents details of calculations conducted to determine the potential rail transportation noise impacts onto the project.

To predict noise impacts, calculations were made using the recognised Nordic Rail Prediction Method (Kilde Rep.130) for passenger and freight rail noise, which is also recommended by TMR document *Attachment A - Railway Noise Assessment Report Structure and Specific Issues*. Calculations were assisted by a three-dimensional computer model (acoustic simulation model) of the site and proposed developments created within SoundPLAN 9.0 acoustic software.

The acoustic simulation model was created as a representation of the existing and future site, which incorporated the following inputs:

- Calculation algorithms – SoundPLAN implementation of accepted noise prediction standards;
- Terrain elevation – A 3D representation of the existing terrain and at completion of construction;
- Ground surface corrections – Areas of soft (absorptive) and hard (reflective) ground;
- Roads sources – The placement of each road source as a source line and the input of traffic flow parameter;
- Buildings – Detailed implementation of the proposed building from drawings (i.e., layout, height, floors), and
- Sensitive receptors – Locations where the noise limits are to be assessed.

Refer to **Appendix C** for further details regarding the acoustic simulation model.

5.1.2 Model Verification of Accuracy

The acoustic simulation model is to be considered verified when the difference between the measured and predicted noise levels at the monitoring location is less than ± 2 dB. The single event maximum (SEM) was calculated using the TMR Guide (refer to **Table 1**) with results **Table 15** result.

Table 15: Rail traffic noise model verification

Location	Noise descriptor	Monitor location predicted noise level	Measured noise level	Difference
Unattended Monitor (refer to **Figure 1**)	SEM	**82.5**	**82.4**	-0.1
	$L_{Aeq,24hr}$	**59.6**	**59.8**	+0.2

The acoustic simulation model has therefore been validated and any noise predictions have been made without corrections, other than those stated in this report, applied to the results.

5.1.3 Predicted Noise Levels – L_{Amax}

The acoustic simulation model was used to predict the L_{Amax} noise levels from rail sources at 1 m from the façade of each sensitive use associated with a sole-occupancy dwelling. Based on the predicted levels, façade noise categories have been determined in accordance with QDC MP4.4 with the results presented in **Table 16**. Unit numbering used for the assessment and markups of locations impacted by noise categories ≥1 are provided in **Appendix D**.

Table 16: Predicted facade LAmax noise levels and QDC MP4.4 noise categories

Floor	Unit	Room	L_{max} dB(A)	QDC MP4.4 Category
Upper Ground	Unit 1	Living	69	Category 1

Floor	Unit	Room	L_{max} dB(A)	QDC MP4.4 Category
	Unit 1	Bed 2	69	Category 1
	Unit 1	Bed 3	69	Category 1
	Unit 4	Living	69	Category 1
	Unit 4	Bed 2	71	Category 1
Level 1	Unit 1	Living	69	Category 1
	Unit 1	Bed 2	69	Category 1
	Unit 1	Bed 3	69	Category 1
	Unit 4	Living	69	Category 1
	Unit 4	Bed 2	70	Category 1
Level 2	Unit 1	Living	70	Category 1
	Unit 1	Bed 2	69	Category 1
	Unit 1	Bed 3	69	Category 1
	Unit 2	Living	69	Category 1
	Unit 2	Bed 1	69	Category 1
	Unit 2	Bed 2	69	Category 1
	Unit 3	Living	69	Category 1
	Unit 3	Bed 1	70	Category 1
	Unit 3	Bed 2	70	Category 1
	Unit 4	Living	71	Category 1
	Unit 4	Bed 1	70	Category 1
	Unit 4	Bed 2	71	Category 1
	Unit 5	Living	70	Category 1
Level 3	Unit 1	Living	70	Category 1
	Unit 1	Bed 2	69	Category 1
	Unit 1	Bed 3	69	Category 1
	Unit 2	Living	70	Category 1
	Unit 2	Bed 1	70	Category 1
	Unit 2	Bed 2	70	Category 1
	Unit 3	Living	70	Category 1
	Unit 3	Bed 1	70	Category 1
	Unit 3	Bed 2	70	Category 1
	Unit 4	Living	71	Category 1
	Unit 4	Bed 1	70	Category 1
	Unit 4	Bed 2	71	Category 1
	Unit 5	Living	70	Category 1
Level 4	Unit 1	Living	71	Category 1
	Unit 1	Bed 2	69	Category 1
	Unit 1	Bed 3	69	Category 1
	Unit 2	Living	71	Category 1
	Unit 2	Bed 1	71	Category 1
	Unit 2	Bed 2	70	Category 1
	Unit 3	Living	70	Category 1

Floor	Unit	Room	L_{max} dB(A)	QDC MP4.4 Category
	Unit 3	Bed 1	70	Category 1
	Unit 3	Bed 2	70	Category 1
	Unit 4	Living	71	Category 1
	Unit 4	Bed 1	69	Category 1
	Unit 4	Bed 2	71	Category 1
	Unit 5	Living	70	Category 1
Level 5	Unit 1	Living	71	Category 1
	Unit 1	Bed 1	71	Category 1
	Unit 1	Bed 2	71	Category 1
	Unit 2	Living	72	Category 1
	Unit 2	Bed 1	71	Category 1
	Unit 2	Bed 2	70	Category 1
	Unit 2	Bed 3	70	Category 1
	Unit 3	Living	69	Category 1
Level 6	Unit 1	Living	72	Category 1
	Unit 1	Bed 1	71	Category 1
	Unit 1	Bed 2	71	Category 1
	Unit 2	Living	72	Category 1
	Unit 2	Bed 1	71	Category 1
	Unit 2	Bed 2	70	Category 1
	Unit 2	Bed 3	69	Category 1
	Unit 3	Living	69	Category 1
	Unit 6	Living	70	Category 1
	Unit 6	Bed 1	70	Category 1
Level 7	Unit 1	Living	71	Category 1
	Unit 1	Bed 1	71	Category 1
	Unit 2	Living	72	Category 1
	Unit 2	Bed 1	70	Category 1
	Unit 2	Bed 2	70	Category 1
	Unit 2	Bed 3	69	Category 1
Level 8	Unit 1	Living	71	Category 1
	Unit 1	Bed 1	71	Category 1
	Unit 2	Living	72	Category 1
	Unit 2	Bed 1	70	Category 1
	Unit 2	Bed 2	70	Category 1
	Unit 2	Bed 3	69	Category 1

5.1.4 Predicted Noise Levels – Private Open Spaces

The predicted free-field $L_{Aeq\ (24hr)}$ rail noise level at the unattended noise monitoring location (refer to **Figure 1**) is less than 59.8 dB(A) (refer to **Table 4**) based on current daily train volumes. As the development is located 120m further from the rail line $L_{Aeq,24hr}$ will be lower than those measured at the monitoring location. Therefore, the development private open spaces are predicted to comply with the SDAP criterion ($L_{Aeq,24hr}$ 62 dB) for private open spaces with allowance for future rail traffic growth.

The highest L_{Amax} noise level predicted at the façade of the development was 72 dB(A) (refer to **Table 16**). This is below the SDAP noise limit of L_{Amax} 82 dB(A); therefore, compliance with the L_{Amax} criterion is anticipated for all private open spaces

Since the development is expected to meet the private open space noise limits, the solid balustrades and absorptive soffit linings specified in PO44 of SDAP SC2 are not deemed necessary.

5.2 Mechanical Plant Noise Emissions

5.2.1 Assessment Overview

Noise emissions from proposed mechanical services selections are required to comply with the EPA 1994 criteria (see **Section 4.2**).

Given the current stage of the project, the type of building services plant, finalised locations and selection details (incl. noise levels) are not typically available and, therefore, detailed calculations cannot be conducted. Further, given the varied extent of likely plant locations, it is considered impractical to assign a single maximum permissible sound power level which will result in compliance at all noise sensitive locations.

Onsite sole occupancy units located adjacent to plant rooms will require the intervening partition to achieve R_w 50 and be of discontinuous construction for compliance with the National Construction Code 2022.

For emissions to offsite receivers, costing should allow for:

- Enclosures, noise barriers or acoustic louvres;
- Acoustic attenuators (for exhaust fans);
- In-duct linings; and / or
- Quiet equipment selections with custom silencer / attenuation options.

6. Summary of Recommendations

Rail Noise Intrusion - Façade

- Some apartments within the development require acoustic façade upgrades up to QDC MP4.4 noise category 1. A summary of these locations is provided in **Table 16** with markups and unit numbering presented in **Appendix D**.

Rail Noise Intrusion – Private Open Spaces

- No further treatments are deemed necessary to predict compliance with SDAP SC2 criteria for all private open spaces.

Mechanical Services Emissions

- Emissions from mechanical plant services are required to be designed to comply with EPA 1994. When equipment selection noise levels are known, these shall be assessed against the relevant environmental noise limit.

7. Conclusion

Stantec have been engaged by Retire Australia to undertake a noise impact assessment for the development application stage of the Retire Australia – Lot 101 Yeronga project located at 70 Park Rd, Yeronga QLD 4104.

This acoustic report has;

- outlined the acoustic services scope of works for the project;
- established relevant acoustic criteria in accordance with current Legislation, Regulations, Council Policies, Australian Standards and Design Guidelines;
- identified key acoustic issues that are to be addressed by the project during subsequent design stages
- detailed acoustic assessments undertaken for the project.

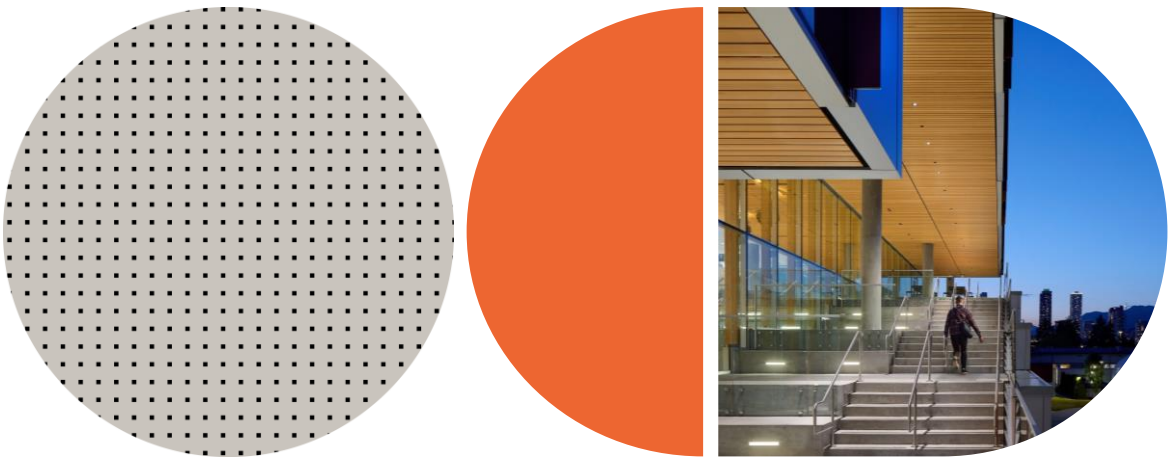
We trust that this report to be sufficient for your current requirements; however, should you have any queries, please do not hesitate to contact the undersigned on (07) 3029 5000.

Regards,

Marcus Kamppi (Author)
Senior Acoustic Engineer for **Stantec**

Michael Lanchester (Reviewer)
Acoustics Section Manager (QLD) for **Stantec**

Appendices



Appendix A Glossary of Acoustic Terms

TERM	DEFINITION
Adverse Weather	Weather conditions that affect noise (wind and temperature inversions) that occur at a particular site for a significant period of time. The previous conditions are for wind occurring more than 30% of the time in any assessment period in any season and/or for temperature inversions occurring more than 30% of the nights in winter).
Assessment Location	The position at which noise measurements are undertaken or estimated.
Assessment Period	The period in a day over which assessments are made.
Attenuation	A reduction in the magnitude of sound.
A-weighting	A frequency dependent filter applied to an instrument-measured noise. In its simplest form, the filter is designed to replicate the relative sensitivity to loudness perceived by the human ear.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the LA90 noise level.
Barrier	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc. used to reduce noise.
dB	The abbreviation for decibel.
dB(A)	A-weighted sound level in decibels.
Dw	A single number value that represents a field measurement of the weighted level difference between two adjacent spaces separated by a partition. Dw = L1 – L2 where, L1 is the average sound pressure level in the source room; and L2 is the average sound pressure level in the receiver room.
Free Field	An environment in which there are no acoustic reflective surfaces. Free field noise measurements are carried out outdoors at least 3.5 m from any acoustic reflecting structures other than the ground.
Frequency	Frequency is synonymous to pitch. Frequency or pitch can be measured on a scale in units of Hertz (Hz). Most noise sources typically comprise of a vast, and often complex, range of frequencies.
Frequency Response	This is a characteristic of a system which has a measured response resulting from a known applied input. In a mechanical structure, the frequency response function (FRF) is the spectrum of the vibration of a structure divided by the spectrum of the input force to the system. To measure the frequency response of a mechanical system, one must measure the spectra of both the input force to the system and the vibration response.
Intermittent Noise	Level that drops to the background noise level several times during the period of observation.
LA1	The A-weighted sound pressure level exceeded for 1 % of the measurement time period.
LA10	The A-weighted sound pressure level exceeded for 10 % of the measurement time period.
LA90	The A-weighted sound pressure level exceeded for 90 % of the measurement time period. Typically represents the background noise level of an environment.
LAeq	The equivalent continuous sound pressure level in dB(A). It is often accompanied by an additional suffix “T”, which is indicative of the measurement time period. (e.g. LAeq,15min, symbolising the measurement is evaluated over 15-minutes).
LAmax	The maximum A-weighted sound pressure level recorded over the measurement period.
Reflection	Sound wave changed in direction of propagation due to a solid object met on its path.
Reverberation	The persistence of a sound within a space, which will naturally decay over time. Most apparent once the source signal has ceased emitting. Reverberation may have effects on speech intelligibility if not adequately controlled. Reverberation time, represented in seconds, can vary depending on the volume and surface finishes of the space.
Rw	Weighted sound reduction index. A single number value which represents the airborne sound insulation performance of a partition or building element that has been determined under laboratory testing conditions.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Power Level	The total sound energy radiated by a source, expressed in Watts. The sound power level is ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Sound Pressure Level	The measured acoustic wave strength in a given environment and at a particular point of interest where the total sound level expressed is relative to a reference pressure, i.e. the threshold of human hearing. Sound pressure level is typically measured using a standard sound level meter with a microphone, expressed in decibels (dB).

Appendix B Noise Monitoring Details

Unattended noise logging was conducted from Friday 23rd April 2021 to 30th April 2021 (inclusive) at the location shown in **Figure 1** (coordinates in **Table 17**). This location was selected due to a high degree of exposure to the railway line.

Table 17: Noise monitoring coordinates

Monitor	Latitude	Longitude
001	-27.515506	153.020467

The following instrumentation was used:

- An NTi XL2 Class 1 sound level meter (S/N A2A-12892-E0), and Pulsar 105 Class 1 acoustic calibrator (S/N 72913). The instrument had a current calibration certificate by a certified National Association of Testing Authorities (NATA) acoustics laboratory at the time of measurements.

Noise measurements were conducted in accordance with Australian Standard AS 1055:2018 – *Acoustics – Description and measurement of environmental noise*, and the instruments were configured as follows:

- A-weighting frequency response;
- FAST time response;
- 15-minute, 1 minute and 1 second intervals.

The sound level meter was calibrated before and checked at the end of the measurement period. The instrument showed a drift less than ±1 dB during the course of monitoring; therefore, measurements are considered valid according to AS1055:2018.

Audio was recorded during the measurements period and used for the purpose of identifying contributing noise sources.

Noise monitoring results

The raw sound level meter files were post-processed to determine relevant long-tern noise descriptors, some of which were used to determine the applicable noise limits.

Results and time trace plots of relevant noise descriptors are provided below (see **Table 18** and **Figure 5**). Where data was not measured for a full period (i.e. at the start and end of measurement), the cells are shown dashed in the table. In addition, the noise descriptor averages are presented.

A summary of weather observations by the Bureau of Meteorology (BoM) during the monitoring period is presented in **Table 19**. Where adverse weather (e.g. rain, excessive wind) occurred within the monitoring period, the measured data has been excluded.

Table 18: Summary of measured noise levels (rounded)

Noise descriptor	Average	23-Apr-21	24-Apr-21	25-Apr-21	26-Apr-21	27-Apr-21	28-Apr-21	29-Apr-21
$L_{A10(18hr),6am-12am}$	61	—	61	60	60	62	62	62
$L_{Aeq,7am-6pm}$	62	—	61	60	60	63	64	63
$L_{Aeq,6pm-10pm}$	61	61	60	60	60	60	62	61
$L_{Aeq,10pm-7am}$	58	58	58	57	59	59	59	—
$RBL_{,7am-6pm}$	45	—	41	38	40	44	45	46
$RBL_{,6pm-10pm}$	45	43	43	42	47	43	44	43
$RBL_{,10pm-7am}$	35	33	33	32	35	35	34	—
$L_{A90,7am-6pm}$	45	—	43	41	43	47	48	49
$L_{A90,6pm-10pm}$	49	45	46	47	48	47	47	47
$L_{A90,10pm-7am}$	38	38	37	36	39	39	38	—

Figure 5: Time trace of relevant noise descriptors

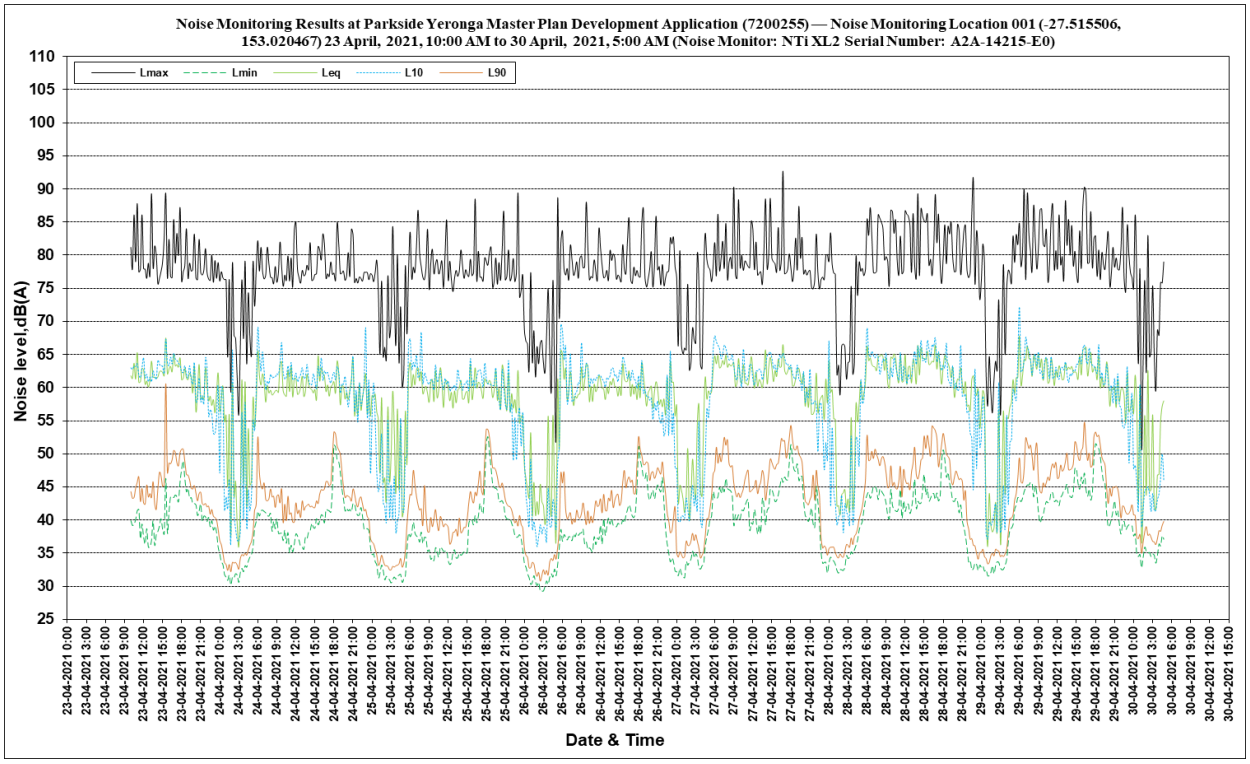


Table 19: Summary of BoM weather observations during unattended monitoring (monitored days highlighted)

Brisbane, Queensland
April 2021 Daily Weather Observations

Most observations from Brisbane City, but some from Brisbane Airport.

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	18.0	26.2	0		5.7	SSE	31	15:09	23.6	57	6	SSW	7	1020.9	23.4	68	7	SSW	4	1018.8
2	Fr	17.9	26.6	2.8		8.8	E	41	14:46	23.7	59	2	SSE	11	1022.5	24.1	53	7	ESE	17	1021.0
3	Sa	20.5	25.4	0		1.2	ESE	33	14:10	22.6	70	7	SSE	7	1021.6	22.5	80	7	ESE	9	1019.0
4	Su	19.6	22.5	8.4		0.0	ENE	20	13:58	20.7	92	8	WSW	2	1019.6	21.4	91	8	ESE	4	1016.4
5	Mo	20.1	23.3	9.4		0.0	SE	30	15:31	21.6	87	8	SSE	11	1016.4	23.0	87	8	SE	13	1013.3
6	Tu	20.9	24.3	45.4		0.9	E	37	05:21	22.1	94	8	S	6	1015.7	22.9	85	7	SSE	11	1013.1
7	We	19.6	27.5	20.6		6.5	SSE	30	11:07	22.4	86	7	SSW	9	1013.0	27.4	57	6	SE	13	1008.8
8	Th	19.2	28.1	0		10.2	S	26	09:51	24.7	63	7	S	11	1008.8	26.7	59	1	S	6	1005.7
9	Fr	18.3	30.6	0		10.6	WNW	19	14:24	23.9	63	0	WSW	4	1009.3	30.3	45	2	W	6	1004.6
10	Sa	17.7	33.0	0		10.9	W	28	13:41	24.2	61	1	WSW	4	1008.7	32.7	30	1	WSW	7	1004.7
11	Su	18.3	29.2	0		7.4	W	30	15:40	22.5	57	7	SW	4	1010.7	29.0	30	1	W	11	1008.3
12	Mo	13.2	24.6	0.2		10.0	SE	26	13:52	18.9	39	1	WSW	9	1018.0	23.6	49	1	ENE	9	1016.1
13	Tu	14.7	24.9	0		10.7	SE	20	10:55	21.4	52	1	SSW	6	1021.9	23.2	42	2	ESE	9	1018.9
14	We	13.6	26.3	0		10.8	NE	19	15:05	19.5	64	1	WSW	6	1020.7	25.4	47	1	NE	6	1016.7
15	Th	15.0	28.4	0		10.9	NE	19	14:25	20.6	69	0	WSW	6	1017.6	26.6	49	1	NNE	7	1014.0
16	Fr	17.1	30.5	0		10.0	E	28	16:05	22.5	63	1	SW	2	1017.6	27.5	52	3	ENE	9	1015.2
17	Sa	19.5	24.7	0		0.7	SE	26	00:32	21.2	67	8	SW	6	1019.6	23.6	68	7	E	6	1016.3
18	Su	15.0	24.9	24.6		8.5	ENE	19	16:40	19.5	63	2	SW	7	1018.6	23.8	49	2	SSE	7	1015.4
19	Mo	14.4	26.5	0.2		10.9	SSE	19	09:24	20.3	61	1	SW	6	1019.1	25.2	44	1	NNE	6	1015.7
20	Tu	14.6	27.6	0		10.7	NNE	19	16:43	20.3	69	0	WSW	6	1019.1	27.4	35	1	WNW	4	1014.4
21	We	14.5	30.1	0		10.9	W	31	15:59	22.4	62	0	WSW	6	1015.1	29.8	26	1	WSW	13	1010.3
22	Th	12.0	22.0	0		1.0	W	24	22:08	16.7	62	7	SSW	6	1016.6	21.1	40	7	W	6	1012.5
23	Fr	11.6	25.0	0		10.9	WSW	17	11:33	18.7	35	1	SSW	7	1018.8	24.6	29	1	N	2	1016.1
24	Sa	12.2	25.1	0		10.7	NE	17	14:27	18.3	60	1	SSW	6	1022.5	23.8	49	1	ENE	7	1019.3
25	Su	13.7	26.6	0		10.5	NE	17	14:59	19.8	70	1	SSW	4	1022.6	25.1	47	1	ENE	7	1019.2
26	Mo	15.0	24.8	0		9.7	ESE	20	20:55	20.2	70	1	SSW	6	1023.7	24.1	48	2	E	9	1020.8
27	Tu	16.0	25.8	0		7.8	ESE	24	15:45	20.7	66	3	SW	6	1025.6	23.6	52	1	E	9	1021.7
28	We	15.7	24.6	0		5.5	E	22	17:54	21.2	63	1	SSW	7	1024.2	22.6	58	7	SE	7	1021.3
29	Th	15.7	25.1	0.6		8.5	E	28	14:56	19.6	69	6	SSW	4	1023.4	22.3	60	6	ESE	15	1020.8
30	Fr	17.1	24.2	0		1.7	ESE	33	13:31	21.5	70	7	SE	9	1025.0	19.8	85	8	ESE	7	1023.8
Statistics for April 2021																					
	Mean	16.4	26.3			7.4				21.2	65	3		6	1018.6	24.9	53	3		8	1015.4
	Lowest	11.6	22.0			0.0				16.7	35	0	#	2	1008.7	19.8	26	1	N	2	1004.6
	Highest	20.9	33.0	45.4		10.9	E	41		24.7	94	8	#	11	1025.6	32.7	91	8	ESE	17	1023.8
	Total			112.2		222.6															

Temperature, humidity, wind, pressure and rainfall observations are from Brisbane (station 040913). Cloud, evaporation and sunshine observations are from Brisbane Aero (station 040842)

Brisbane Airport is located about 12 kilometres north east of the Brisbane City site, and closer to the coast. The evaporation, sunshine and cloud values should be used as a guide only.

IDCJDW4019.202104 Prepared at 13:01 UTC on 5 Sep 2021

Appendix C Noise Modelling Detail

A three-dimensional computer model of the study area was created within SoundPLAN 9.0 software. The following inputs were utilised in building the model:

- **Topography** – refer to **Table 20** below

Table 20: Topographical inputs for the development of the computer model

File	Description	Date received
210908 Existing Terrain.dxf	Existing terrain used by Civil designers	8th Sept 2021
210908 Proposed ROL Boundaries.dxf	Proposed Reconfiguration of Lot Boundaries	
210908 Proposed Terrain.dxf	Proposed finished terrain levels designed by Civil designers	
Nearmap Aerial Photography	Used to determine and location of existing buildings nearby to the site.	Photography date: 8th May 2025

- **Calculation algorithms** – Rail noise emissions were calculated using the SoundPLAN implementation of the Nordic Rail Prediction Method (Kilde Rep.130) used for both passenger and freight rail noise.
- **Ground surface corrections** – 20% ground absorption factor accounting for predominately compacted soil and concrete / asphalt surface types between source and receptor.
- **Rail traffic parameters** – Rail traffic parameters used are reproduced in **Table 21** and **Table 22**.

Table 21: Acoustic simulation model rail inputs and assumptions

Modelling element	Input / Assumption
Ground Elevation Geometry	Refer to **Table 20**.
SoundPLAN Assessment Methodology	Rail Noise Impact: Kilde report 67/130
Rail Alignment	From aerial photography (aggregated to one line equidistant between all lines.)
Existing Rail Traffic Flow Data	Supplied by Queensland Rail for the lines Email from Tony.Bennett@qr.com.au Fri 2021/05/14 6:03 AM
Proposed (2036) Rail Traffic Flow Data	Sourced from: https://crossriverrail.qld.gov.au/resources/rfpc4/136_Technical-reports.pdf **Table 9.2. Train volumes for the CRR Project** Segment / Year 2026 / Year 2036 Freight Train Movements / Passenger Train Movements / Freight Train Movements / Passenger Train Movements Yeerongpilly - Park Road: 34, 488, 42, 577 *Up*: 244, 278 *Down*: 165, 195 *Dual Gauge*: 34, 79, 42, 104
Train Types and Parameters Used	See **Table 22**.

Table 22: Train types and parameters used in modelling

Train type	Number of trains (provided by QR)	Length per train, m	Speed (km/h)	Rail track height above the ground, m	ΔL_{eq}, dB	ΔL_{type} Engine, dB	ΔL_{type} Wagons, dB
Citytrain	255	150	60 est.	0.6	-9.2	-2.0	-2.0

Freight	16	540	30 est.	0.6	-8.0	-3.0	-3.0
Diesel Loco	16	37	30 est.	3.6	-8.0	1.0	1.0

ΔLeq: is the correction factor applied to the standard Kilde report $L_{Aeq,24hr}$ predicted noise level to correct for train length and expected noise levels adjusted / calibrated to unattended noise logging conducted by Stantec.

ΔLtype engine: is the correction factor applied to the standard Kilde report predicted L_{Amax} at 10 metres (engine = moving point source) adjusted / calibrated to unattended noise logging conducted by Stantec.

ΔLtype wagons: is the correction factor applied to the standard Kilde report predicted L_{Amax} at 10 metres (wagons = line source) adjusted / calibrated to unattended noise logging conducted by Stantec.

- **Sound reflections -** The number of reflections from barriers, buildings and the ground has been set to 3. Reflections from buildings to rail noise producing an increase in rail noise at the façade prediction point carry a +3 dB correction as required by Kilde Rep.130 for rail noise predictions.
- **Search radius** - The noise source search radius was setup at 5000m.

Appendix D QDC MP4.4 Noise Categories

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SKETCH TITLE *Prepared By: MK*

RETIRE AUSTRALIA - LOT 101 YERONGA
QDC MP4.4 Noise Categories Markup

PROJECT No.	SKETCH No.	DATE	REV
301051102	AC-SK-001	21/07/2025	001

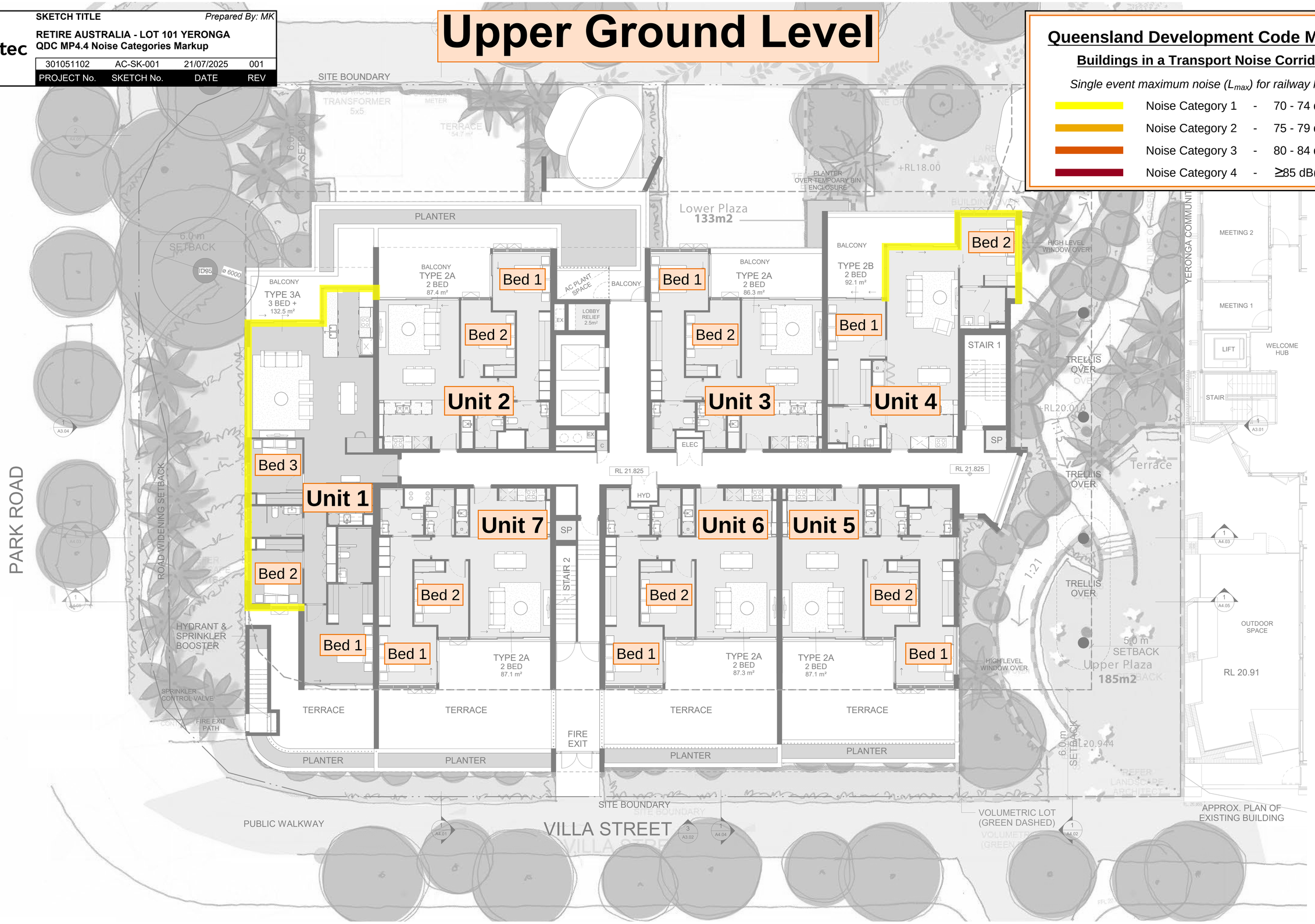
Upper Ground Level

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)



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Level 1

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

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QDC MP4.4 Noise Categories Markup

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Levels 2 - 4

CCT

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Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
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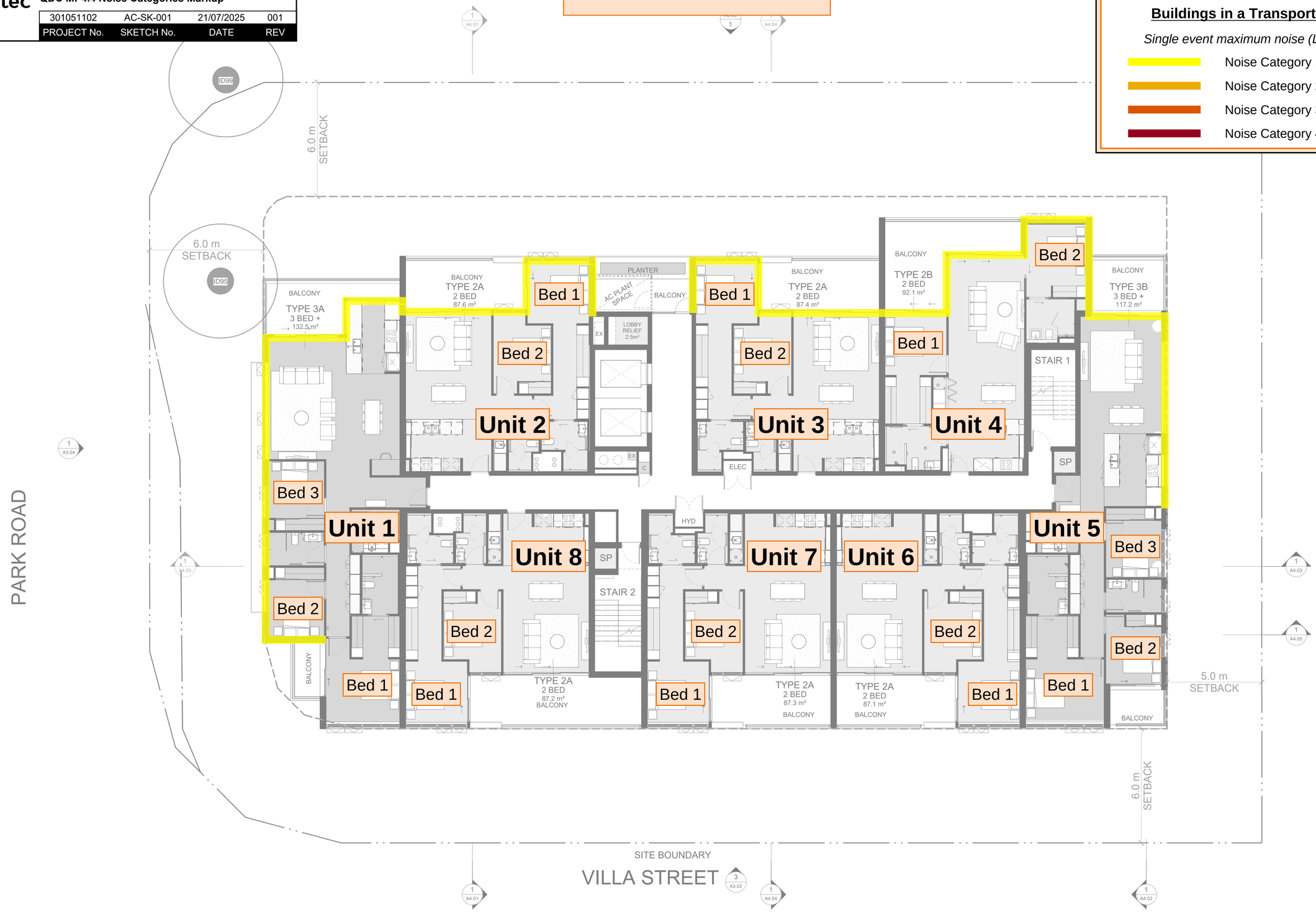

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RETIRE AUSTRALIA - LOT 101 YERONGA
QDC MP4.4 Noise Categories Markup

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Level 4 Roof

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

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QDC MP4.4 Noise Categories Markup

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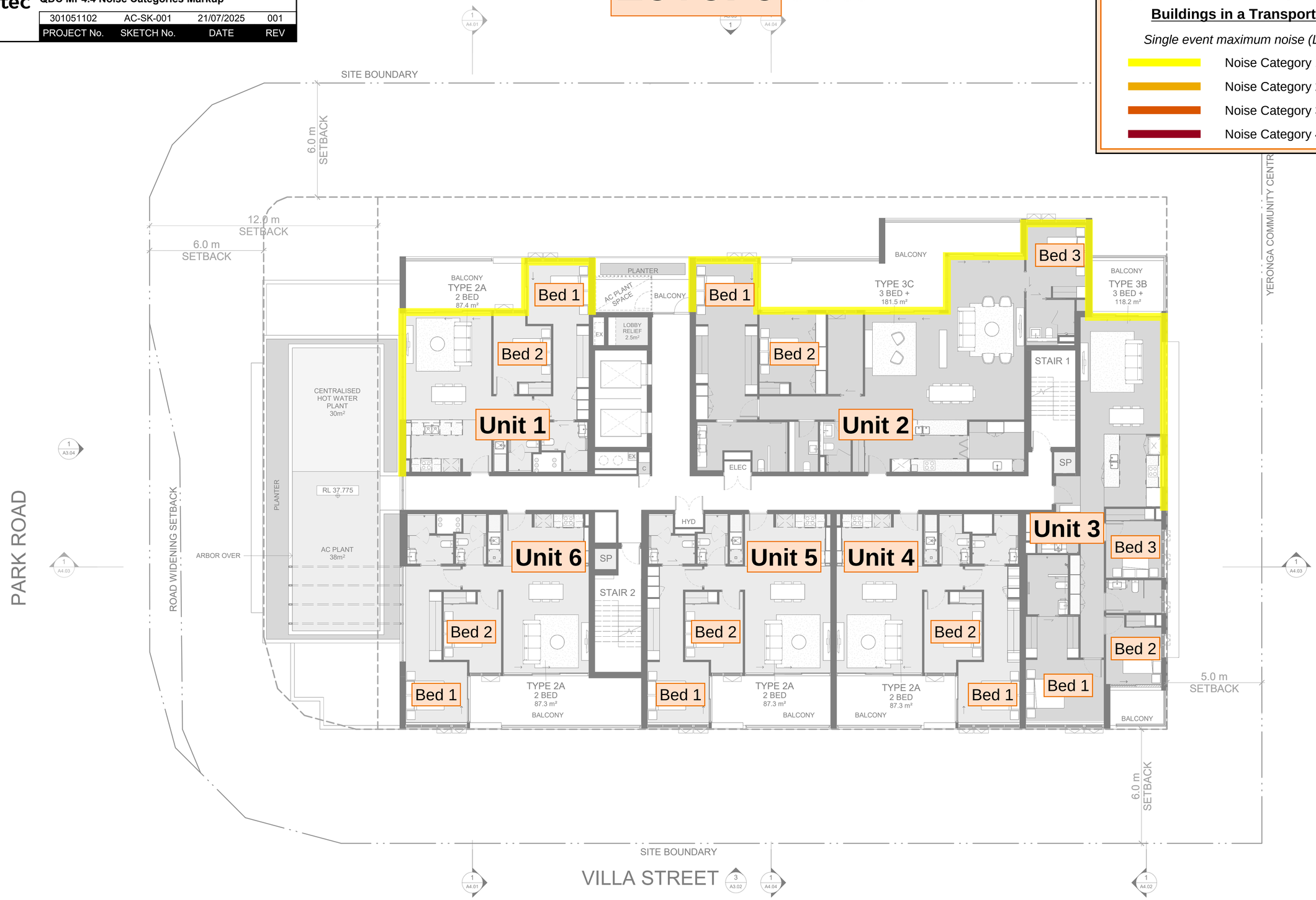
Level 5

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)



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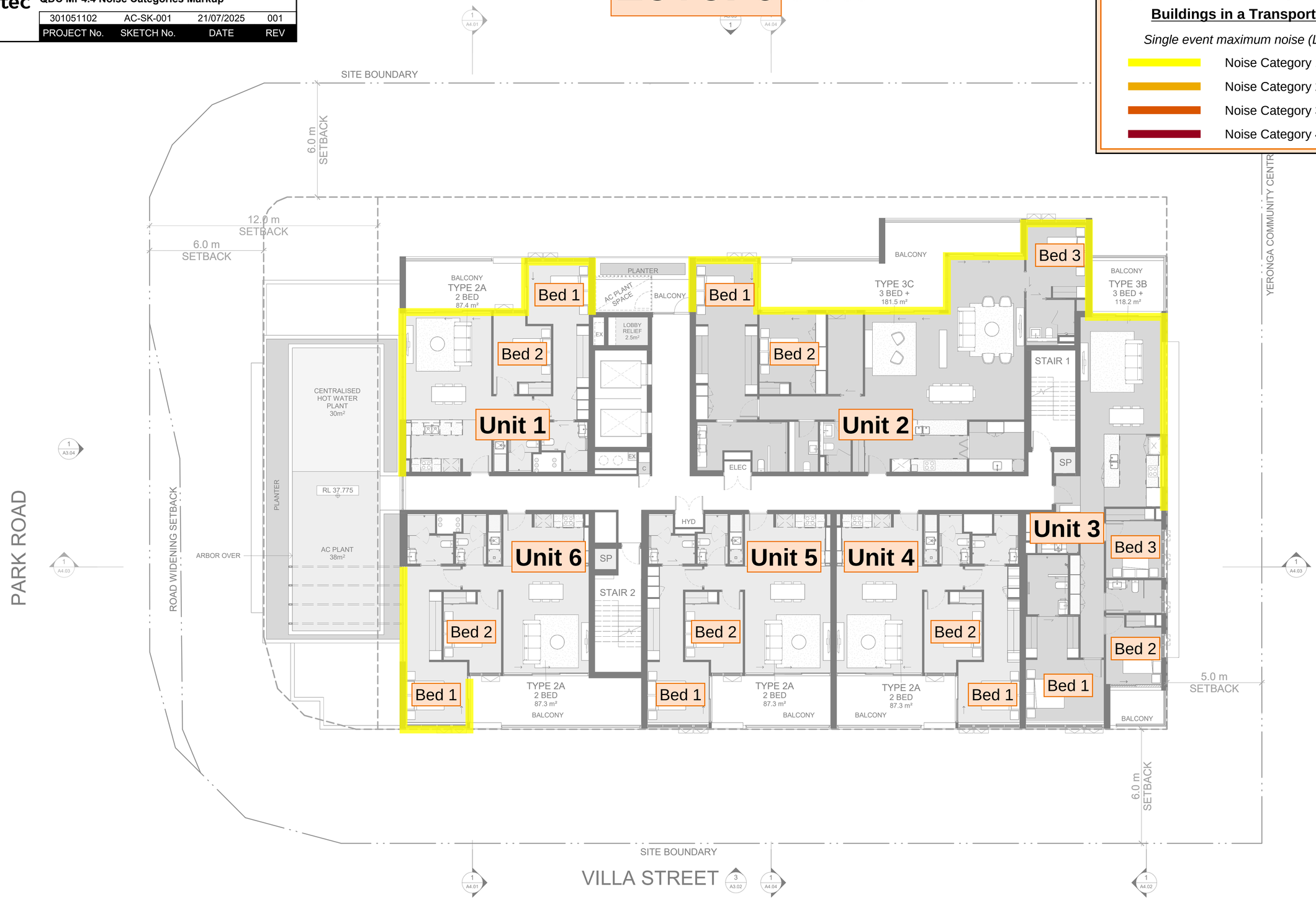
Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
Noise Category 2	-	75 - 79 dB(A)
Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)



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RETIRE AUSTRALIA - LOT 101 YERONGA
QDC MP4.4 Noise Categories Markup

PROJECT No.	SKETCH No.	DATE	REV
301051102	AC-SK-001	21/07/2025	001

Levels 7 - 8

CCT

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

Noise Category 1	-	70 - 74 dB(A)
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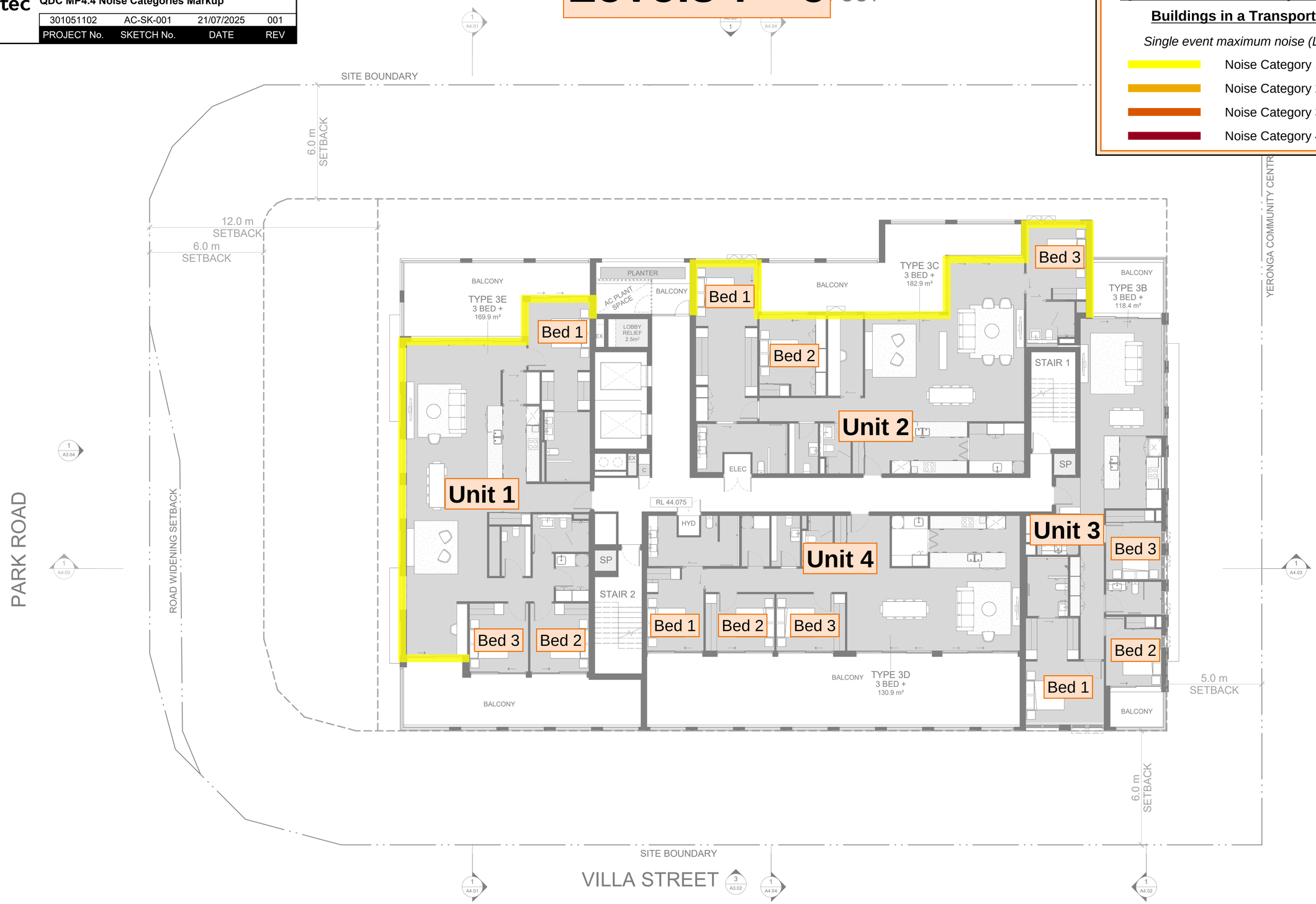

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Level 8 Roof CCT

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Buildings in a Transport Noise Corridor

Single event maximum noise (L_{max}) for railway land

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Noise Category 3	-	80 - 84 dB(A)
Noise Category 4	-	≥85 dB(A)

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