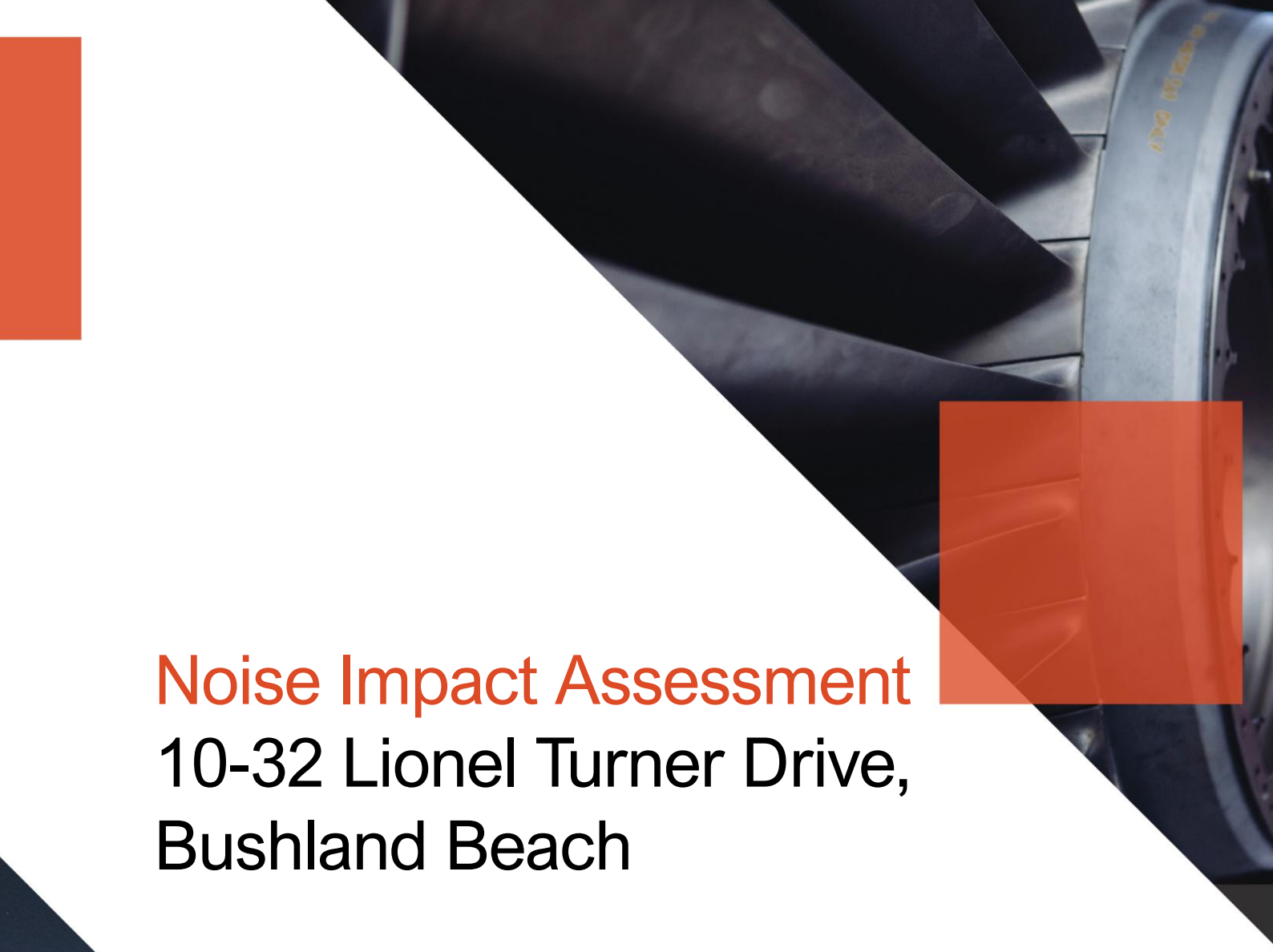
ATTACHMENT 5

Noise Impact Assessment

Prepared by:

Live It Acoustics



Noise Impact Assessment

10-32 Lionel Turner Drive, Bushland Beach

Prepared for Swanland Group Pty Ltd

Reference #70250014-ENAC-RPT01-R1

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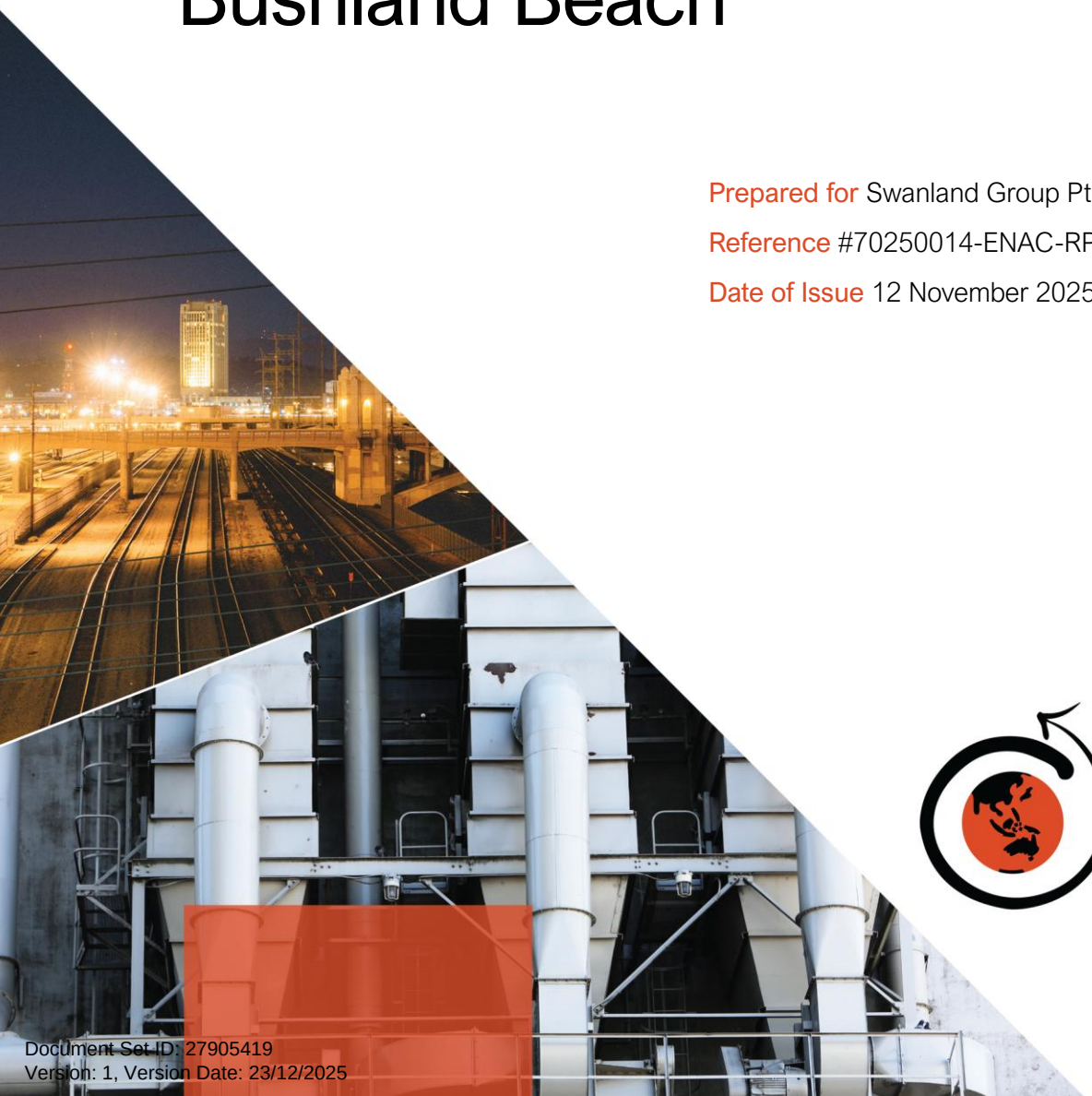

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R0	Draft	11/11/2025	John Barker	Draft report for client review
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Quality Assurance Disclaimer

This assessment and subsequent report have been prepared in accordance with the policies and procedures found within Live It Acoustics Quality Management System (QMS). This QMS is based on Australian and New Zealand Standard AS/NZS ISO 9001-2016 Quality management systems.

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1 Introduction

Live It Acoustics has been engaged by *Swanland Group Pty Ltd ATF Cyrus Property Development Trust* to undertake a Noise Impact Assessment for a proposed *Reconfiguration of a Lot* (1 lot into 81 lots) at 10-32 Lionel Turner Drive, Bushland Beach QLD 4818.

This report has been prepared in response to an Information Request (IR) issued by Townsville City Council (Item 2 of RAL25/0065 IR dated 17 September 2025), which requires submission of an acoustic report addressing:

- Potential noise impacts from adjacent commercial premises along the western boundary;
- Traffic noise intrusion from Lionel Turner Drive; and
- Potential impacts from the adjoining "Future Development Parcel."

The purpose of this assessment is to evaluate these potential noise sources on the proposed residential allotments and where required, recommend acoustic treatments or management measures for compliance with the applicable criteria.

1.1 Objectives

This Noise Impact Assessment aims to:

- Review applicable state and local noise-related policies and legislation.
- Identify and describe the existing acoustic environment through noise monitoring.
- Quantify existing road traffic noise impacts on the development.
- Identify offsite noise sources with the potential to impact the site and quantify through measurements.
- Establish project specific noise limits based on relevant criteria.
- Develop a noise prediction model to assess noise intrusion on the development.
- Recommend mitigation and management measures, where required.

1.2 Limitations

This report has been prepared exclusively for the use *Swanland Group Pty Ltd ATF Cyrus Property Development Trust* and the relevant assessment authorities. While reasonable care has been taken to verify all data and sources, Live It Acoustics does not warrant the accuracy of information supplied by third parties unless otherwise stated. No liability is accepted for interpretations or conclusions drawn by others without full access to the complete document. The report must be read in its entirety and must not be reproduced or relied upon in part, or for any other purpose, without the written consent of Live It Acoustics.

2 Project Description

The proposal involves the reconfiguration of Lot 2 on SP218628 to create 78 residential allotments, 2 bioretention lots and one 'Future Development' parcel, encompassing a total site area of approximately 4.8 hectares.

Key features of the development are detailed as follows:

- Creation of 78 residential lots from 325 m^2 to 420 m^2 and 2 bioretention lots to be delivered over two stages;
- A 3,745 m^2 Future Development parcel (subject to a separate Development Application) proposed to accommodate a gymnasium and six commercial tenancies with associated car parking;
- Construction of new internal access roads; and
- Site access provided via Lionel Turner Drive.

The location and layout of the proposed development is shown in Figure 1 and Figure 2 respectively.

Figure 1. Proposed development site (aerial image)

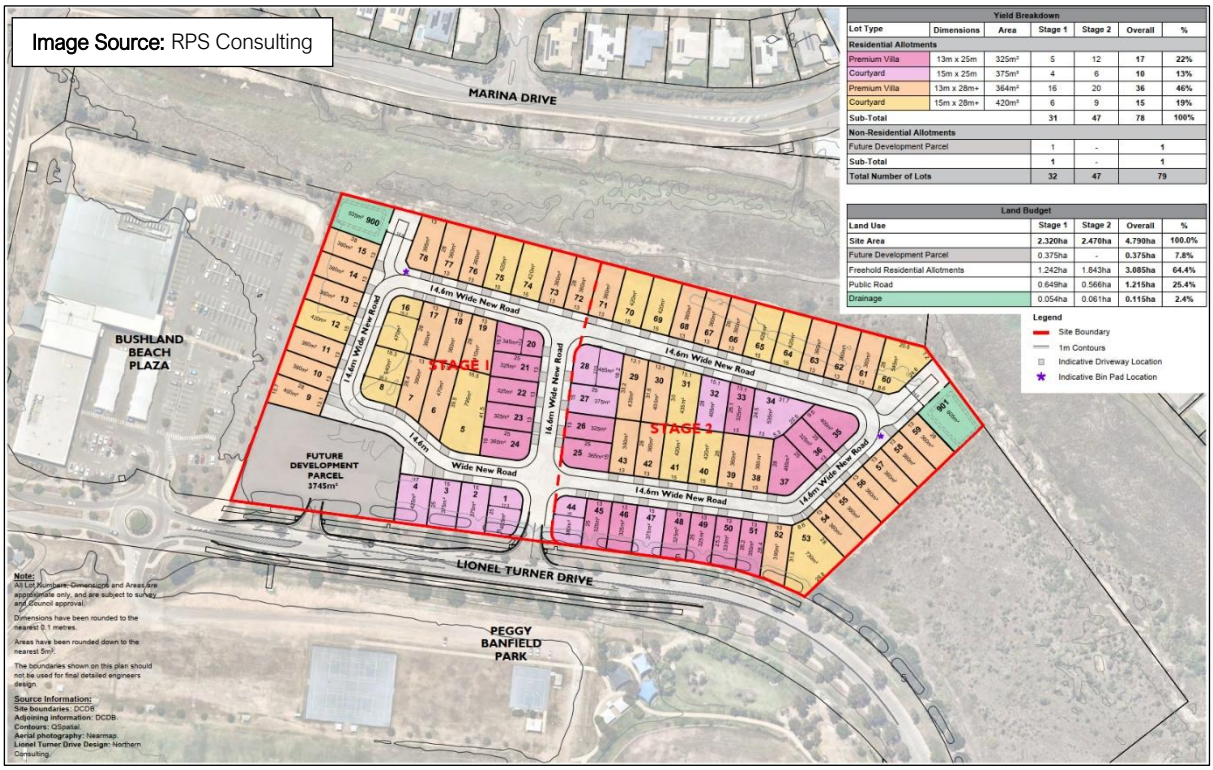

Figure 2. Proposed development layout

3 Existing Environment

3.1 Sensitive Receptors and Land Uses

The Environmental Protection (Noise) Policy 2019 provides definitions for sensitive receptors. For this assessment, only residential allotments within the proposed development have been identified as sensitive receptors.

Based on the proposed subdivision layout, the lots most exposed to potential noise sources are as follows:

- Lots 9-16: most exposed to noise from the adjacent commercial premises to the west;
- Lots 1-4 and Lots 45-54: most exposed to road traffic noise from Lionel Turner Drive; and
- Lot 4 and Lots 5-9: most exposed to potential noise emissions from the Future Development parcel.

Should noise be controlled at these allotments, it is expected that noise would also be controlled at all other lots due to additional attenuation from distance separation and topographical screening.

3.2 Existing Acoustic Environment

Site visits were undertaken by Live It Acoustics on 27 October 2025 and 4 November 2025. The inspections found that the primary contributors to the acoustic environment were road traffic noise from the local road network and noise from the adjacent commercial use. Rooftop mechanical plant associated with the Bushland Beach Plaza commercial premises was audible during both site visits and represents a continuous component of the acoustic environment.

No insect noise was observed during the site visits.

3.2.1 Noise Monitoring Methodology

To quantify the existing acoustic environment and establish road traffic noise levels associated with Lionel Turner Drive, unattended noise monitoring was conducted from 27 October 2025 and 4 November 2025 using a Rion NL-42 (Serial #00171580) Class 2 noise monitor. The Noise Monitor was installed approximately at the location of the future Lot 3.

The noise monitoring was conducted in accordance with Australian Standard AS1055–2018 *Acoustics – Description and measurement of environmental noise.*

The noise logger was calibrated using a Larson Davis CAL200 (Serial #23157) at sound pressure level of 94.0 dB at 1 kHz before and after the measurements. Calibration drift was within ±0.5 dB and is therefore considered within acceptable limits.

The noise monitor and calibrator held current NATA laboratory calibrations in accordance with AS1055 requirements.

The noise logger was positioned in a free-field location at heights of 1.5m and set to record statistical sound pressure levels Lmin, L90, Leq, L10, Lmax noise descriptors over sampling periods of 15 minutes for the entire monitoring period.

The noise monitoring locations are indicated over aerial imagery below in Figure 3 with a photograph presented in Figure 4.

Figure 3. Noise monitoring location map

Figure 4. Noise monitoring Location 1 (photograph)

3.2.2 Measured Noise Levels

Presented below in Table 1 are the summarised results of the noise monitoring.

Table 1. Measured noise levels at Location 1

Date	Sound Pressure Level Leq,T in dBA			Sound Pressure Level L90,T in dBA			Sound Pressure Level L10,18hr in dBA	Sound Pressure Level L90,18hr in dBA	Sound Pressure Level Leq,1hr (max) in dBA
	Day	Eve.	Night	Day	Eve.	Night			
Monday 27 October 2025	[2]	52	52	[2]	45	46	[2]	[2]	62
Tuesday 28 October 2025	58	53	52	48	46	46	58.2	49	63
Wednesday 29 October 2025	58	53	52	47	46	46	58.7	48	64
Thursday 30 October 2025	56	53	51	47	46	45	56.4	47	59
Friday 31 October 2025	57	54	52	47	47	45	58.6	48	61
Saturday 1 November 2025	56	52	50	47	46	45	n/a	n/a	n/a
Sunday 2 November 2025	54	52	50	46	45	45	n/a	n/a	n/a
Monday 3 November 2025	[1]	52	50	[1]	45	44	58.2	47	[1]
Tuesday 4 November 2025	56	[2]	50	45	[2]	45	[2]	[2]	59
Overall	**57**	**53**	**51**	**47**	**46**	**45**	**58.0**	**48**	**61**

[1] affected by weather or extraneous noise and removed prior to determining overall value.

[2] not enough data to calculate result.

Any periods of inclement weather or extraneous noise were omitted prior to determining the overall results. Noise monitoring graphs for the monitoring periods are provided in Appendix B – Noise Monitoring Graphs.

3.2.3 Attended Noise Measurements

Attended noise measurements were undertaken by Live It Acoustics on 27 October 2025 to supplement the unattended monitoring and verify noise levels measured at Monitoring Location

1. The attended survey focused on quantifying noise emissions from the existing Bushland Beach Plaza commercial precinct, located immediately west of the proposed development site.

Measurements were conducted using a Rion NL-52 precision sound level meter (Class 1) calibrated before and after use with a Larson Davis CAL200 acoustic calibrator.

The attended survey:

- Identified the dominant noise sources affecting the site including mechanical plant equipment and general car park activity; and
- Verified the representativeness of unattended monitoring data collected at Monitoring Location 1.

Observations indicated that noise levels were predominantly influenced by continuous emissions from rooftop mechanical plant servicing the Bushland Beach Plaza building. The plant noise was characterised as broadband airflow noise, generated by high-velocity discharge through a fan grille/duct outlet.

Vehicle movements and other car park noise associated with the shopping centre were barely perceptible at the subject site due to the presence of a continuous 2.5m high acoustic fence between the site and the commercial premises. A gap of approximately 2.0m was identified near the midpoint of the fence alignment.

The results of attended noise measurements are presented in Table 2, with measurement locations indicated over aerial imagery below in Figure 5.

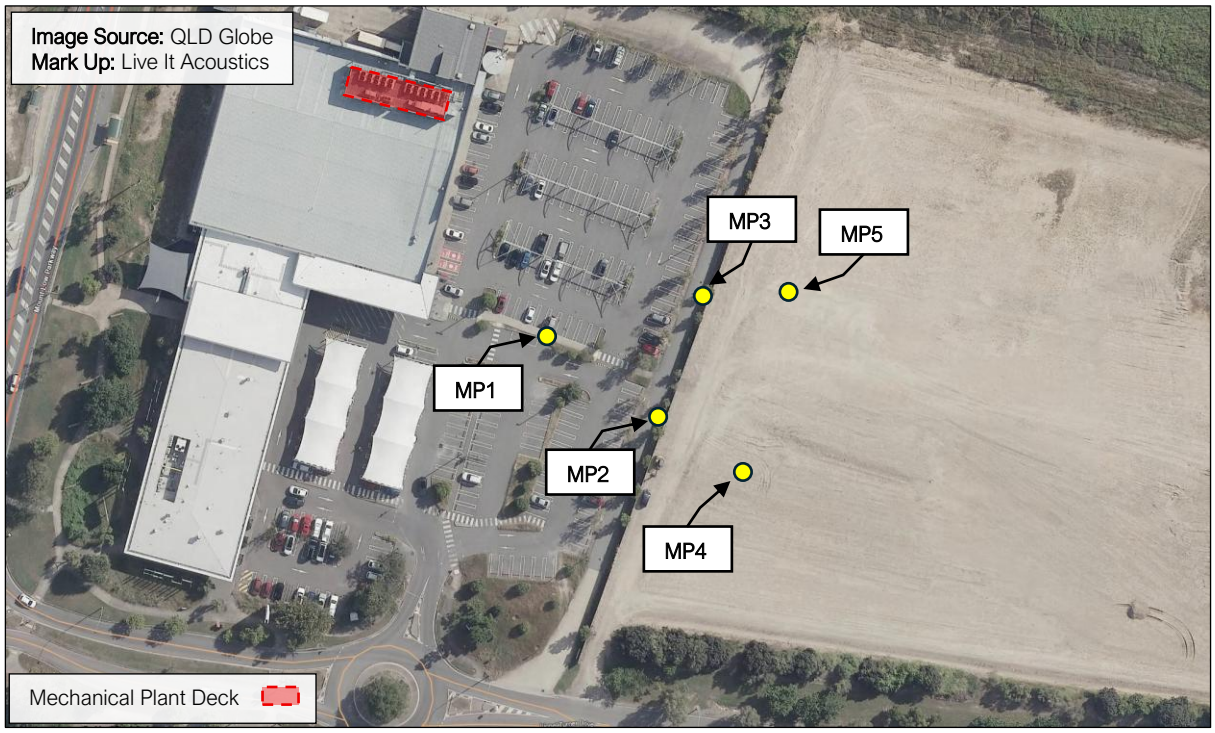

Figure 5. Attended noise measurement locations

Table 2. Measured noise levels of commercial precinct

Location	Measurement Duration (min:sec)	LAeq,T dB	LA90,T dB	LAmin,T dB	Comments
MP1	1:00	56	54	53	Mechanical plant noise clearly audible; dominated by high-velocity airflow over grille.
MP2	1:00	55	53	52	Mechanical plant noise clearly audible; façade-reflected measurement due to fence.
MP3	1:00	56	54	53	Mechanical plant noise clearly audible; façade-reflected measurement due to fence.
MP4	1:00	51	49	47	Mechanical plant noise clearly audible; free-field measurement.

Location	Measurement Duration (min:sec)	LAeq,T dB	LA90,T dB	LAmin,T dB	Comments
MP5	1:00	50	49	48	Mechanical plant noise clearly audible; free-field measurement.

Locations MP4 and MP5 were selected as the primary onsite measurement positions as these locations had the highest perceived noise levels generated by the rooftop mechanical plant. These positions were unscreened by the 2.5m acoustic fence, allowing direct assessment of free-field plant noise emissions.

Based on the measurement results, a conservative noise level of 51 dBA Leq has been adopted as the assessment reference level. This value will be used to determine the required acoustic performance of building façades and construction treatments to achieve compliance with the applicable noise intrusion criteria.

4 Noise Criteria

In establishing noise criteria for this assessment, the following legislative and regulatory documents were reviewed:

- Townsville City Council Information Request (Ref: RAL25/0065 dated 17 September 2025).
- Townsville City Plan 2024.
- Environmental Protection Act 1994.
- Environmental Protection (Noise) Policy 2019.

4.1 Townsville City Council Information Request

Townsville City Council provided specific advice in relation to acoustic items within an Information Request issued on 17 September 2025 (Ref: RAL25/0065). Request Item 2 which relates to acoustics is reproduced below:

Request Item 2 – Noise Impact Assessment

The applicant is requested to submit a Noise Impact Assessment prepared by a suitably qualified person in accordance with SC6.4.19.4 Noise and vibration impact assessment of the Townsville City Plan. The Noise Impact Assessment must consider:

a) Potential noise impacts arising from existing commercial activities adjacent to the proposed residential lots along the western boundary;
b) Noise impacts affecting proposed residential lots adjacent Lionel Turner Drive;
c) Anticipated noise impacts on proposed residential lots adjoining the designated "Future Development Parcel.

Reason

To demonstrate compliance with Performance Outcome PO10 of the Low density residential zone of the Townsville City Plan.

4.2 Townsville City Plan

The following relevant assessment benchmarks may apply to this development:

- Reconfiguring a lot code;
- Low density residential zone code;
- General development requirements code.

4.2.1 Reconfiguring a lot code

The development is required to demonstrate compliance with the 'Reconfiguring a lot code'. The applicable performance and acceptable outcomes have been presented below in Table 3.

Table 3. Reconfiguring a lot code assessment benchmarks

Development near infrastructure corridors and other major facilities	
Performance outcomes (PO)	Acceptable outcomes (AO)
PO21: Reconfiguration ensures an appropriate level of amenity and safety is achieved for residential and other sensitive land uses through appropriate separation and buffering from nearby incompatible uses, including Department of Defence landholdings, major hazard facilities, intensive animal industries, major sport, recreation and entertainment facilities, sewerage, water and waste treatment and disposal facilities and industrial areas. The continued safe and efficient operation of these types of facilities is protected. Editor's note—A report by a suitably qualified person may be required to allow an assessment to be made of the potential environmental impacts of or affecting the proposed reconfiguration. Council recommends that applicants seeking approval for lots potentially affected by intensive animal industries refer to the *Reference Manual for the Establishment and Operation or Beef Cattle Feedlots in Queensland, Queensland Dairy Farming Environmental Code of Practice, Environmental Code of Practice for Queensland Piggeries and Best Practice Technical Guide for the Meat Chicken Industry* and that applicants consult with Primary Industries and Fisheries prior to the lodgement of a development application. For other uses council may require a study that, amongst other matters, identifies how the development is in accordance with *Environmental Protection (Air) Policy 2008 or Environmental Protection (Noise) Policy 2008.* Editor's note—Applicants may be required to prepare a Noise impact assessment as outlined in the Development manual planning scheme policy no. SC6.4 - SC6.4.19 Noise and Vibration.	No acceptable outcome is nominated.

Development near infrastructure corridors and other major facilities	
Performance outcomes (PO)	Acceptable outcomes (AO)
PO22: Reconfiguration of land potentially affected by the impacts of a transport noise or other noise generating activities ensure the development is designed to facilitate adequate noise management. **Editor's note**—Applicants may be required to prepare a Noise impact assessment in accordance with the Development manual planning scheme policy no. SC6.4 - SC6.4.19 Noise and Vibration.	No acceptable outcome is nominated.

4.2.2 Low density residential zone code

The following relevant assessment benchmarks from the Low density residential zone code apply to this development, and the relevant performance and acceptable outcomes are presented below in Table 4.

Table 4. Low density residential zone code assessment benchmarks

General development requirements code	
Performance Outcomes (PO)	Acceptable Outcomes (AO)
PO10: Development minimises impacts on surrounding land and provides for an appropriate level of amenity within the site, having regard to: a) noise; b) hours of operation; c) traffic; d) visual impact; e) odour and emissions; f) lighting; g) access to sunlight; h) privacy; and i) outlook.	No acceptable outcome is nominated.

No specific acceptable outcome is provided to demonstrate compliance with PO10 for noise. Therefore, reference to SC6.4.19 Noise and vibration of the Townsville City Plan has been made.

4.2.3 Schedule 6.4.19 Noise and Vibration

Townsville City Plan Schedule 6 provides a planning scheme policy for noise and vibration. The purpose of the policy is to ensure the development is managed in a way which prevents nuisance from the effects of noise and vibration on the health, community wellbeing and quality of life of an individual or the community, and wildlife.

4.2.3.1 Amenity Noise Limits

The ambient noise level within an area from all noise sources combined should remain below the recommended amenity noise levels. Section SC6.4.19. Table SC6.4.19.1 of the policy sets out maximum recommended amenity levels for various areas and uses.

The relevant maximum recommended amenity levels for sensitive uses are reproduced below in Table 5.

Table 5. SC6.4.19.1 - Maximum recommended amenity of noise levels for all sources

Receiver	Noise Amenity Area	Time of day	Maximum Recommended Amenity Noise Level for All Sources LAeq,15min
Residence	Suburban - an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.	Day	55
		Evening	45
		Night	40
Commercial premises	All	When in use	65

4.2.3.2 Sleep Disturbance

The potential for sleep disturbance caused by maximum noise level events during the night-time period requires consideration. Sleep disturbance may occur through both awakenings and disruption of normal sleep stages, even when full awakenings do not occur.

Under the Townsville City Plan, LAmax assessment only applies to ‘specified noise sources’ which are defined as impact noises; hammering; loading/unloading; dropping items; beepers, alarms, bells, phones, sirens; power tools; valve releases; air brakes; door slamming. People noise and vehicle pass-by noise (engine, exhaust, induction, tyres) are specifically excluded.

In accordance the Townsville City Plan, where the proposed development achieves compliance with the following maximum noise event trigger levels, no further detailed assessment of sleep disturbance is required:

a) LAeq,15min 40 dB(A) 1 metre from the façade or the existing rating background level plus 5 dB, whichever is the greater.
b) The arithmetic average of the maximum levels from up to 15 single events over a given night-time period LAFmax 52 dB(A) 1 metre from the façade or the existing rating background level plus 15 dB, whichever is the greater.
c) The absolute highest LAFmax 60 dB(A) 1 metre from the façade or the existing rating background level plus 15 dB, whichever is the greater.

There is potential for sleep disturbance arising from short-duration impact events associated with the adjoining commercial premises and Future Development parcel. Accordingly, a sleep disturbance assessment has been undertaken to quantify impacts and to verify compliance with the maximum criteria specified under the Townsville City Plan.

4.3 Environmental Protection Act 1994

Environmental noise control in Queensland is governed under the Environmental Protection Act 1994 (EP Act) and subordinate legislation, which aims to strike a balance between protecting the amenity of SRs and allowing industrial, commercial and development activities to occur in an ecologically sustainable manner.

Under the EP Act, noise is considered a contaminant and noise nuisance is considered environmental harm.

There is a general environmental duty to prevent and minimise environmental harm under the EP Act. The EP Act specifically states:

A person must not carry out an activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the general environmental duty).

The Environmental Protection (Noise) Policy 2019 provides a framework as to the prevention and minimisation of environmental harm as it relates to The EP Act.

4.4 Environmental Protection (Noise) Policy 2019

The primary purpose of the Environmental Protection (Noise) Policy is to achieve the overall objective of the Environmental Protection Act in relation to the acoustic environment. This involves the prevention or minimisation of environmental harm.

Environmental harm, which includes environmental nuisance, is the adverse or potential adverse impact on an environmental value. An environmental value is a quality of the environment that is conducive to ecological health or public amenity or safety.

4.4.1 Environmental Values

According to the Environmental Protection (Noise) Policy, environmental values to be enhanced or protected are the qualities of the acoustic environment that are conducive to:

- Protecting the health and biodiversity of ecosystems;
- Human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to sleep, study and be involved in recreation, including relaxation and conversation; and
- Protecting the amenity of the community.

4.4.2 Noise Management Hierarchy

The Environmental Protection (Noise) Policy provides a hierarchy for managing noise that affects or may affect an environmental value. The Policy states that to the extent it is reasonable to do so, noise must be dealt with in the following order of preference:

- Firstly—avoid the noise;
- Secondly—minimise the noise, in the following order;
    - firstly—orientate an activity to minimise the noise;
    - secondly—use best available technology to minimise the noise;
- Thirdly—manage the noise.

The Policy also provide quantifiable noise criteria for SRs, which are designed to protect environmental values. This is discussed further below.

4.4.3 Acoustic Quality Objectives

Schedule 1 of the Environmental Protection (Noise) Policy provides Acoustic Quality Objectives for SRs. The relevant Acoustic Quality Objectives have been summarised below.

Table 6. Environmental Protection (Noise) Policy – Acoustic Quality Objectives

Sensitive receptor	Time of day	Acoustic quality objectives (measured at the receptor) dBA			Environmental value
		LAeq,adj,1hr	LA10,adj,1hr	LA1,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

4.5 Summary of noise goals

Table 7 presents the adopted limiting criteria for this assessment.

Table 7. Adopted limiting criteria

Noise source	Receptor type	Compliance location	Noise descriptor, dB	Noise limit, dBA		
				Day	Eve.	Night
Offsite noise sources, including: *Carpark activity, mechanical plant waste collection and commercial deliveries*	Sensitive land uses, includes: Residence	Outdoors	LAeq,adj,1hr	50	45	40
		Indoors	LAeq,adj,1hr	35	35	30
		Outdoors	LAmax	n/a	n/a	60
		Indoors	LAmax	n/a	n/a	45

4.6 Road Traffic Noise Intrusion

Performance Outcome PO22 of the *Townsville City Plan: Reconfiguring a lot code* requires that land potentially affected by the impacts of a transport noise or other noise generating activities ensure the development is designed to facilitate adequate noise management.

Whilst the development is not located adjacent to a state-controlled transport noise corridor, guidance has been taken from *State code 1: Development in a state-controlled road environment*.

To ensure a healthy and comfortable environment for the occupants of the development, the site shall be designed generally in accordance with AO38.1 to achieve the maximum free field acoustic levels in Table 2 of the code.

Table 2 of State code 1 is reproduced below.

Table 8. Maximum free field acoustic levels

Applicable use	Acoustic levels
2.1: Private open space for residential lots	a. ≤ 57 dB(A) L_{10}(18 hour) free field (measured L_{90}(18 hour) free field between 6am and 12 midnight ≤45 dB(A)) b. ≤ 60 dB(A) L_{10}(18 hour) free field (measured L_{90}(18 hour) free field between 6am and 12 midnight ≥45 dB(A))
2.2: Private open space for an accommodation activity (including lots created for a future accommodation activity)	

5 Noise Intrusion Assessment

A noise intrusion assessment has been undertaken to evaluate the potential impact of existing and future external noise sources on the proposed residential development. The assessment draws upon both attended environmental noise measurements and computational noise modelling to quantify predicted noise levels across the site.

5.1 Noise Modelling

5.1.1 Software and Algorithm

Noise prediction was undertaken using computer-aided modelling software SoundPLAN v8.2. SoundPLAN is a well-established, industry-leading noise prediction program, recognised by acoustic consultants, private companies, and government organisations globally.

All noise sources associated with the proposed development have been incorporated into the noise prediction model. To predict noise emissions, SoundPLAN was programmed to use ISO 9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General methods of calculation prediction methodology*.

5.1.2 Noise Model Extents

The noise model extents include the noise sensitive buildings and ancillary structures that are most exposed to the proposed development. The model incorporates all terrain within at least 3km of the site.

5.1.3 Terrain

A terrain model based on light detection and ranging (LiDAR) was sourced from the Department of Natural Resources, Mines and Energy (DNRME).

This bald earth digital elevation model (DEM) was created as part of the 'Townsville 2018 Project'. The DEM was converted from a raster file format to contour lines using QGIS v3.34. The contour lines were then imported into SoundPLAN as elevation lines, allowing SoundPLAN's triangulation algorithms to generate a digital ground model (DGM).

5.1.4 Buildings and Structures

Buildings and structures were identified using a combination of aerial imagery (Queensland Globe & Google Earth) and site visits. The buildings footprints were traced into the noise model from Queensland Government high resolution aerial imagery. Single story buildings were modelled at a height of 4.0 m above natural earth, two-story buildings were modelled at a height of 6.0 m. Auxiliary buildings such as sheds were modelled at 2.5m.

5.1.5 Ground Absorption and Vegetation

Local roads and the development area driveway were modelled as acoustically 'hard' (i.e. reflective) and the remaining areas were modelled as acoustically 'soft' (i.e. absorbent) throughout.

5.1.6 Existing Noise Protection Barriers

A 2.0 m high acoustic fence is proposed along the northern and eastern boundaries separating the Future Development Parcel from the adjoining residential allotments. This proposed acoustic fence has been incorporated into the noise model as part of the assessment.

The aforementioned 2.5m high acoustic fence between the commercial precinct and subject site has also been incorporated into the noise model.

5.2 Future Development Parcel

Potential noise intrusion on the proposed residential allotments arising from the adjoining 'Future Development Parcel' has been assessed using SoundPLAN.

At the time of assessment, the detailed design and operational configuration of the gymnasium (Building 1), café, and retail/commercial tenancies (Building 2) had not been finalised. Accordingly, the modelling adopts a conservative scenario reflecting typical activity patterns and building constructions for comparable developments.

5.2.1 Building 1 (Gymnasium)

Building 1 is proposed as a 24-hour fitness centre, similar in operation to a "Snap Fitness" or "Jetts Fitness" facility, located immediately west and south of future residential lots (Lots 4-9). Noise from this use has the potential to occur during all time periods, primarily from amplified music, free weights impact, and general patron activity.

The gym was modelled in SoundPLAN using the 'Industrial Building' tool, with the following conservative input assumptions applied to estimate building breakout noise:

- Internal reverberant sound pressure level of 85 dBA Leq.
- North and east façades (adjoining residential allotments) constructed from heavy mass materials such as core-filled blockwork or tilt-up panel achieving Rw 50.
- West and south façades assumed to comprise glazed and lightweight construction, achieving a composite transmission loss of Rw 38.
- Roof construction assumed to achieve Rw 40 (typical of metal sheet roofing with a suspended ceiling).

The resultant external noise levels at the nearest proposed allotments were predicted based on façade breakout. The modelling outputs provide a representative indication of likely worst-case noise exposure at the nearest future sensitive receptors.

5.2.2 Carpark Activities

Noise associated with vehicle movements and short-duration delivery activities within the 'Future Development Parcel' were included in the SoundPLAN model to represent typical noise impacts from shared car park areas.

The following inputs were made into the model:

- Vehicle movements were modelled as moving point sources, with travel paths following the main car park circulation route between Lionel Turner Drive and the on-site parking areas. The model incorporated a total of 241 two-way vehicle movements during the peak hour (approximately 121 inbound and 121 outbound), consistent with the weekend peak-hour traffic volumes identified in the Traffic Impact Assessment.
- Delivery van access and egress were modelled along the same path, with the loading bay located north of Building 2 as shown on the development plans. It was assumed that a delivery event would occur for 10 minutes.

The noise source levels used to model carpark activity are presented below in Table 9.

Table 9. Sound power levels

Noise source	Noise descriptor	Lw (dBA)	Source height	Reference
Vehicle movements – cars accessing carpark (per vehicle)	LAeq,adj,1hr	81	0.5 m	SoundPLAN noise emission library.
Vehicle movements – deliveries (per vehicle)	LAeq,adj,1hr	86	1.0 m	SoundPLAN noise emission library.

5.2.3 Building 2 (Commercial/Retail)

Building 2 will contain several commercial and retail tenancies, with the final tenancy mix yet to be confirmed. Given the preliminary level of design detail, it is not possible to quantify expected noise emissions from individual tenancies. Typical low intensity retail and office uses such as hair salons, medical consulting or convenience shops etc. would not be expected to cause adverse noise impacts.

However, should future uses include higher acoustic impact activities, such as licensed food and drink premises, bars or restaurants, a detailed operational noise assessment should be undertaken at the development application stage for the commercial parcel.

5.3 Bushland Beach Plaza Commercial Precinct

Long-term unattended noise monitoring and supplementary attended measurements were undertaken onsite, adjacent to the Bushland Beach Plaza commercial precinct. These measurements were conducted to quantify the existing operational noise emissions from the shopping centre and associated activities such as vehicle movements and mechanical plant operation.

The results of the noise measurements were presented in Section 3.2.3.

The results indicate that existing operational noise emissions from Bushland Beach Plaza are generally within the applicable daytime noise criteria at the most affected residential allotments (Lots 9-16); however, are predicted to exceed the evening and night-time amenity noise criteria.

Observations during the attended survey confirmed that the dominant source of noise was rooftop mechanical plant associated with the shopping centre. The existing acoustic fence along the shared boundary between the commercial precinct and proposed residential lots was observed to be generally in good condition and provides attenuation of vehicle movement and car park noise as intended. However, due to the elevated rooftop position of the mechanical plant, the fence does not provide effective screening of plant noise at the location of the future residential allotments.

Further discussion regarding noise intrusion from the neighbouring commercial precinct and the recommended mitigation measures is provided in Section 7.3.

6 Road Traffic Noise Assessment

This road traffic noise assessment aims to ascertain noise levels impacting on the proposed development from Lionel Turner Drive and determine any necessary acoustic treatments for compliance with the criteria established in Section 4.6.

6.1 Methodology

SoundPLAN implements the prediction model Calculation of Road Traffic Noise (CoRTN) 1988. This is an accepted prediction model by the Department of Transport and Main Roads (TMR) and is referenced in the Transport Noise Management Code of Practice, Volume 1 – Road Traffic Noise (CoP Vol 1).

A 3D computational model was created based on the model inputs described below.

Table 10. General model inputs and parameters

Description	Data / Value
Angle Increment (°)	1.0
Road surface type	5-14mm Bituminous Seal (BS)
Road surface correction factor [1]	+ 1.0 dB
CoRTN correction for QLD conditions [2]	-1.7 dB (façade affected)
	-0.7 dB (free field)
Emission source height above the road (m)	0.5
Receptor heights above natural earth level (m)	1.8
Elevation Data	Townsville 2018 Project – Department of Natural Resources, Mines and Energy (DNRME) - 1 Metre Digital Elevation Model (DEM) of Australia derived from LiDAR.

[1] Acquired from CoP Vol 1 – Table 4.3.4.1.

[2] Acquired from CoP Vol 1 – Table 4.3.2.1.

It should be noted that this assessment is based on the current topographical conditions of the site. If extensive earthworks are planned that significantly alter the finished pad levels of the dwellings relative to the natural ground level, a revised model may be required to reflect those changes.

6.2 Average Annual Daily Traffic

Average Annual Daily Traffic (AADT) data was obtained from the Traffic Impact Assessment prepared by Northern Consulting Engineers (Report Ref: IPA0002C-TIA, Revision E, dated 8 October 2025). The AADT values for Lionel Turner Drive presented in that assessment are summarised below.

Table 11. Traffic Volumes & Road Parameters

Road	Average annual daily traffic		Heavy vehicles %		Road surface type and (correction) [1]	Speed limit
	Year 2026	Year 2036	Year 2026	Year 2036		
Lionel Turner Drive (Eastbound)	1074	1194	8.57	8.21	Bituminous Seal (+1 dB)	60
Lionel Turner Drive (Westbound)	1627	1790	7.81	7.60	Bituminous Seal (+1 dB)	60

[1] Acquired from CoP Vol 1 - Table 4.3.4.1.

6.3 Noise Model Validation

A validation noise model was developed using SoundPLAN to calculate road traffic noise levels at Measurement Location 1. The predicted noise levels were then compared to the actual measured levels at the same location to confirm the accuracy of the model for noise predictions. The free-field Queensland calibration factor specified above was applied during the validation process.

Table 12 below presents the results of the validation model.

Table 12. Comparison of measured and calculated road traffic noise levels

Location	LA10,18hr in dBA		Difference
	Measured	Calculated	
2	58.0	58.4	+0.4

The CoRTN modelling method allows a 2dBA variation from the calculated and measured sound pressure levels. In this instance, there is less than 2dBA difference between the calculated and measured levels, and therefore, the model is considered valid. For the purposes of a conservative assessment, the model was not calibrated down to the measured level.

6.4 Results

Road traffic noise levels have been predicted within the proposed development, with noise contour maps provided Appendix A – Noise Contour Maps. The results have also been tabulated below in Table 13.

The presented noise levels at each of the lots are calculated as 'point receivers' in SoundPLAN, which are located at a standard 6m setback distance from the road or lot boundary as per the QDC MP1.2. The point receiver locations are shown visually in the noise contour maps.

Table 13. Predicted road traffic noise levels at each lot for the year 2036.

Lot	Free-field Noise Level L10,18hr (2036)	Complies with PO38 State Code 1 (L10,18hr ≤ 60)
Lot 1	56	YES
Lot 2	59	YES
Lot 3	59	YES
Lot 4	58	YES
Lot 45	56	YES
Lot 46	58	YES
Lot 47	59	YES
Lot 48	58	YES
Lot 49	59	YES
Lot 50	58	YES
Lot 51	59	YES
Lot 52	59	YES
Lot 53	59	YES
Lot 54	59	YES

Compliance is predicted with the road traffic noise intrusion criteria presented in Section 4.6, provided the recommendations in Section 7 are implemented.

7 Recommendations

To safeguard the acoustic amenity and health of future residential occupants, the following noise management measures and acoustic design treatments are recommended for implementation within the development and during subsequent building design stages.

7.1 Acoustic Barriers

Noise barriers are required and shall be constructed as specified in Appendix D – Noise Barrier Specifications.

- All noise barriers should be constructed to achieve a minimum dry weight surface mass of 12.5 kg/m^2 (excluding structural components) and should contain no holes or gaps.
- Suitable materials may include 19mm lapped timber palings (min. 50% overlap), masonry, Hebel, concrete, 9mm fibre cement sheet, Perspex or other materials satisfying the minimum density requirement.
- The existing gap (~ 2.0m) in the acoustic fence along the commercial precinct boundary should be closed to maintain barrier continuity and minimise noise impacts on the nearest residential allotments. A visual representation is provided in Appendix D – Noise Barrier Specification.
- The western boundary acoustic fence must be maintained in good condition throughout the life of the development to ensure continued attenuation of car park and vehicle movement noise.

7.2 Road Traffic Noise Intrusion

Future dwellings directly exposed to road traffic noise from Lionel Turner Drive should be constructed in accordance with *Queensland Development Code MP 4.4 – Buildings in a Transport Noise Corridor*:

- Any future dwellings to be located on Lot 2 to Lot 4 & Lot 46 to Lot 54 should be constructed to comply with the requirements of QDCMP4.4 Noise Category 1. These requirements are reproduced in Appendix E – QDC MP4.4 Schedule 1 & 2.
- All other future dwellings within the subdivision are designated as Noise Category 0, for which standard building assessment provisions apply, and no additional acoustic treatments are required for road traffic noise.

7.3 Offsite Noise Intrusion

To mitigate external noise intrusion from both the neighbouring Bushland Beach Plaza commercial precinct and the proposed Future Development Parcel, ventilation provisions should be incorporated into all future dwellings located within the development.

Measured and modelled noise levels indicate potential exposure of up to 51 dBA LAeq from commercial rooftop mechanical plant and up to 65 dBA LAmax from short-duration car door slams and vehicle activity within the future development parcel car park. While these noise levels are not considered excessive, they have the potential to cause exceedances of the evening and night-time internal noise criteria where windows are open for natural ventilation.

To achieve internal noise levels in accordance with Townsville City Plan and EPP (Noise) 2019 requirements, it is recommended that all habitable rooms (bedrooms and living areas) of dwellings are provided with an alternative means of ventilation, enabling windows and doors to remain closed during sleep and rest periods. Acceptable forms of alternative ventilation include:

- Ducted or split system air-conditioning; or
- Mechanical ventilation systems that provide adequate outside air exchange without requiring window openings.

7.4 Design Changes

If significant design changes are proposed for the development, such as changes to the lot layout, land use mix, or future development parcel commercial operations, an update to this Noise Impact Assessment should be undertaken.

8 Conclusions

A Noise Impact Assessment has been undertaken for the future development located at 10-32 Lionel Turner Drive, Bushland Beach.

Monitoring of existing road traffic and ambient noise on the subject site was conducted. Following completion of on-site noise monitoring, a SoundPLAN noise prediction model was developed, and noise levels were predicted at the proposed development. Noise mitigation measures were subsequently established to demonstrate compliance with the established road traffic noise intrusion criteria.

The assessment also determined offsite noise impacts from the adjoining Bushland Beach Plaza commercial precinct and the proposed Future Development Parcel, quantifying potential impacts on the residential allotments.

Based on the findings of the assessment, recommendations for acoustic treatments and management controls were outlined in Section 7 to mitigate noise impacts to the development. Should these recommendations be implemented in full, compliance is predicted with Townsville City Council criteria.

Should significant design or layout changes occur during future planning or construction stages, an updated acoustic assessment may be required.

Should further information or investigations be required, please contact Live It Acoustics on 1300 775 800.

Report compiled by

John Barker
BEng (Mech) MIEAust MAAS

Acoustic Consultant

Appendix A

Noise Maps

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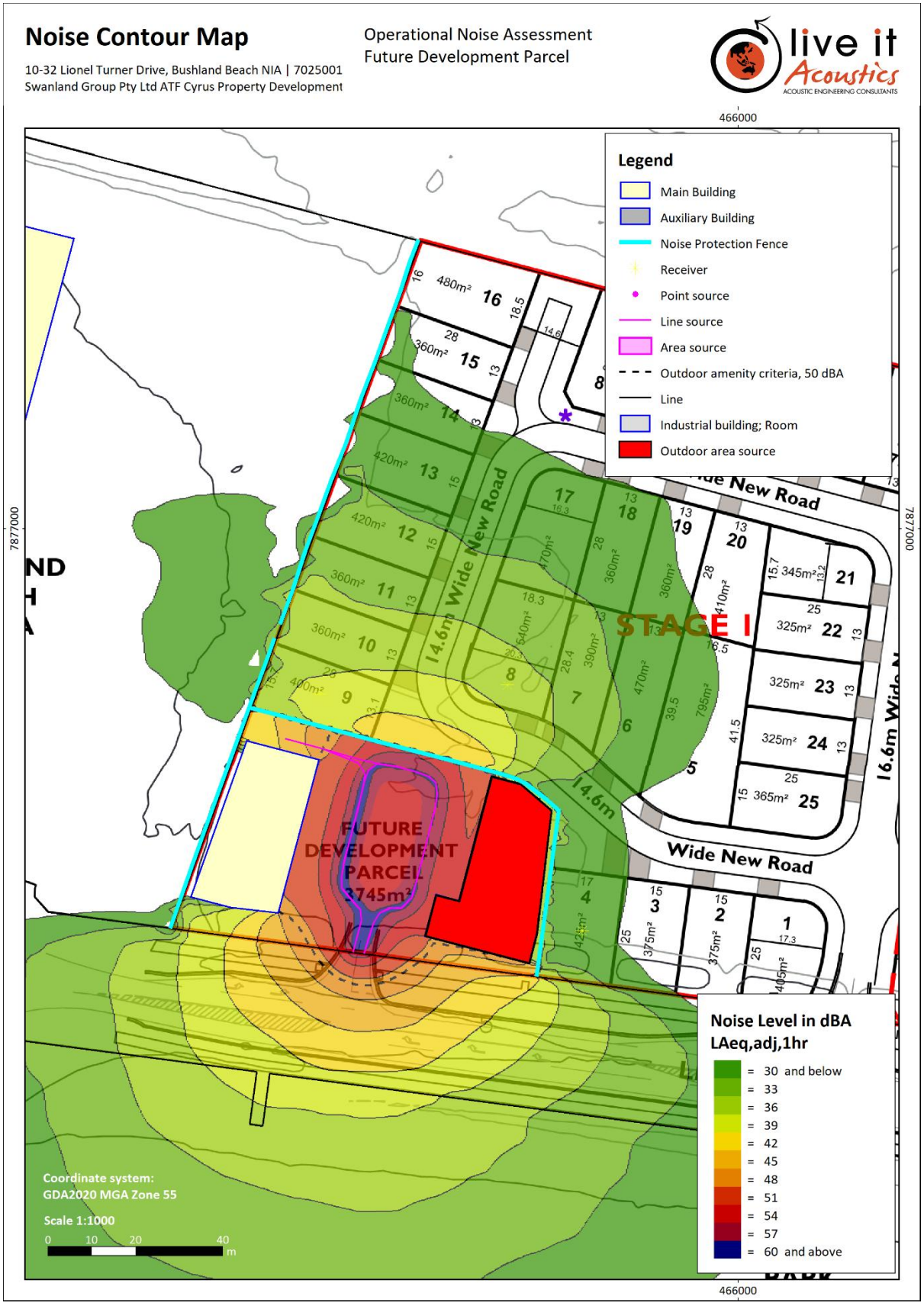

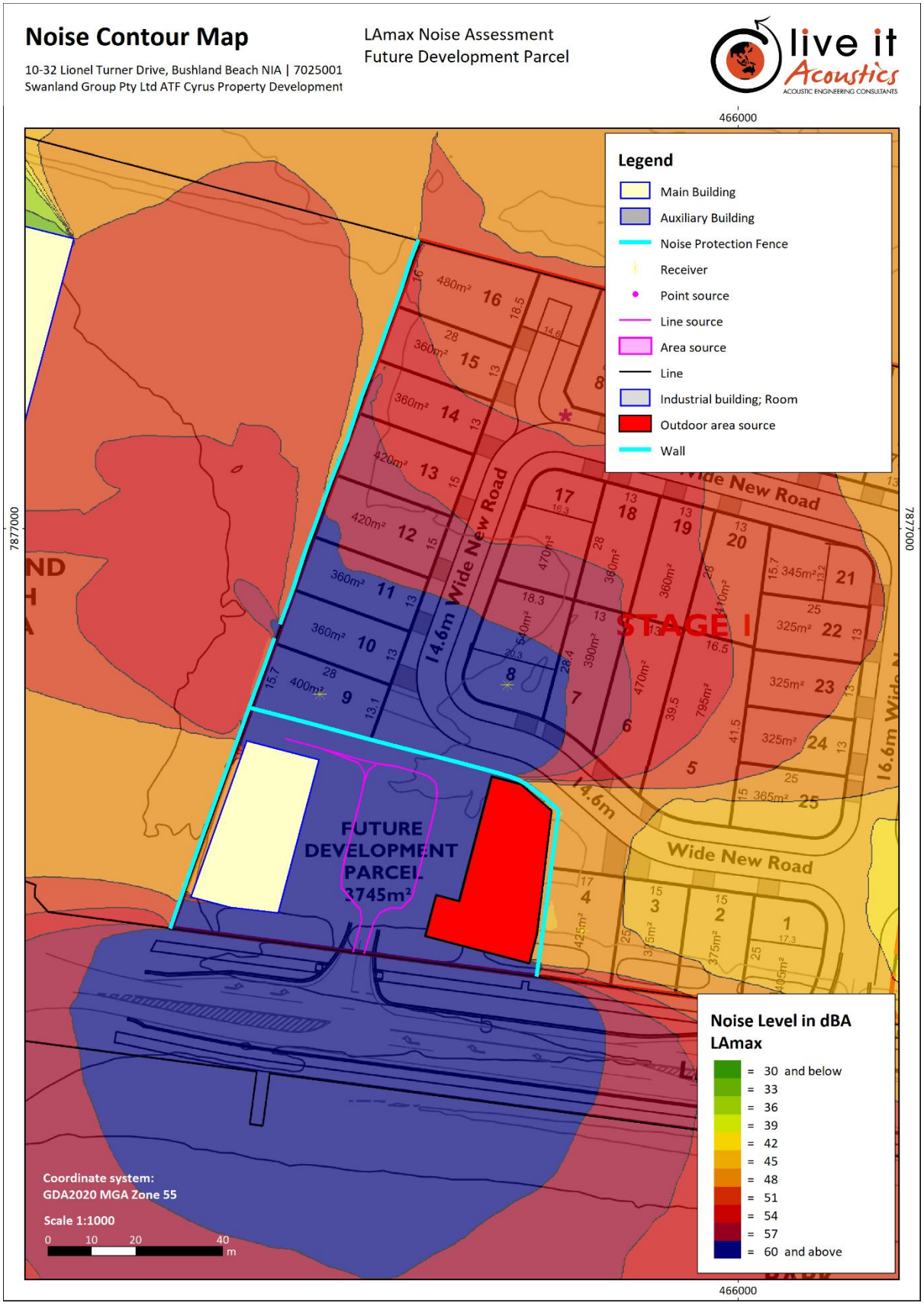

Appendix B

Noise Monitoring Graphs

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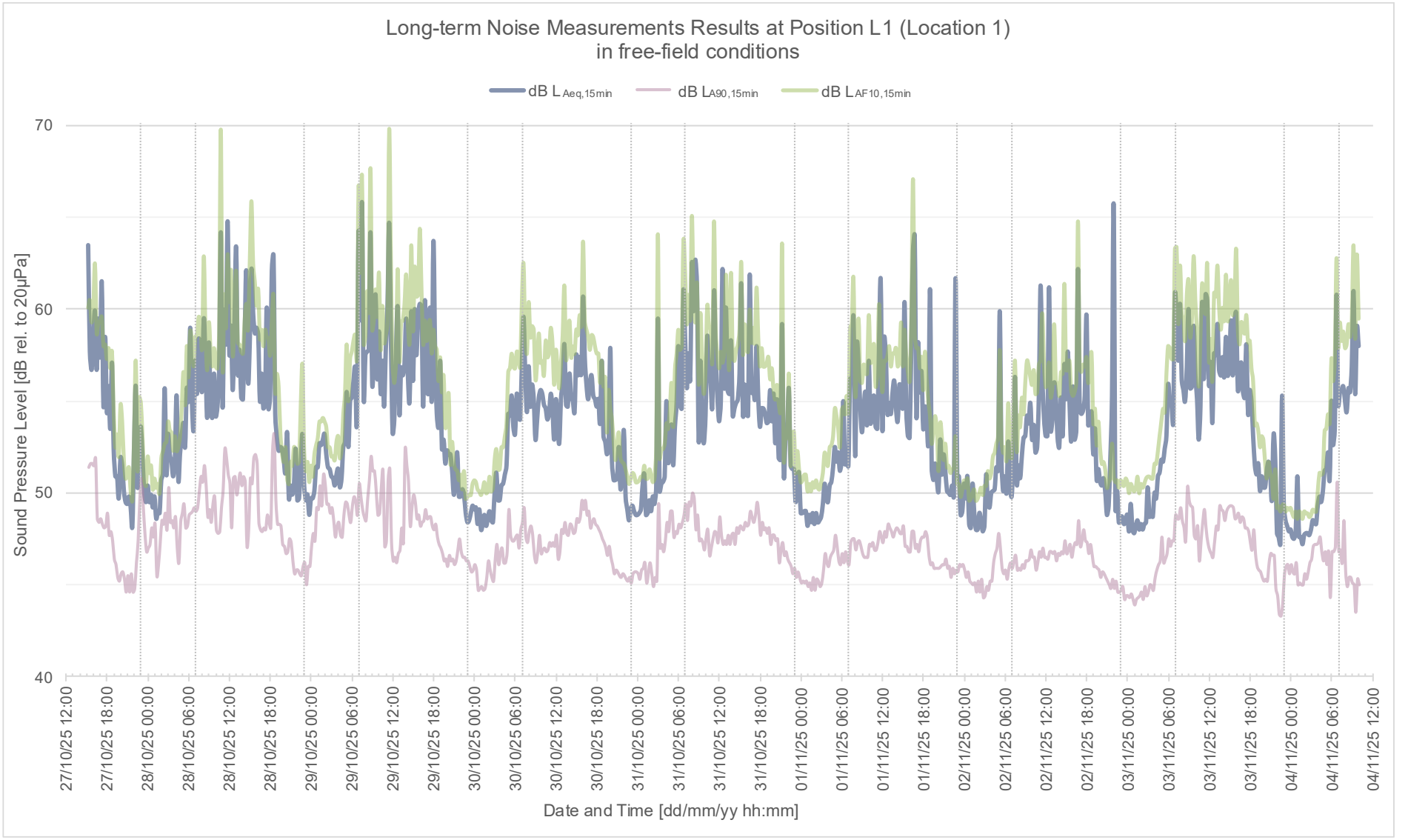

Figure 6. Noise monitoring data – 27 October 2025 to 4 November 2025

Appendix C

Development Plans

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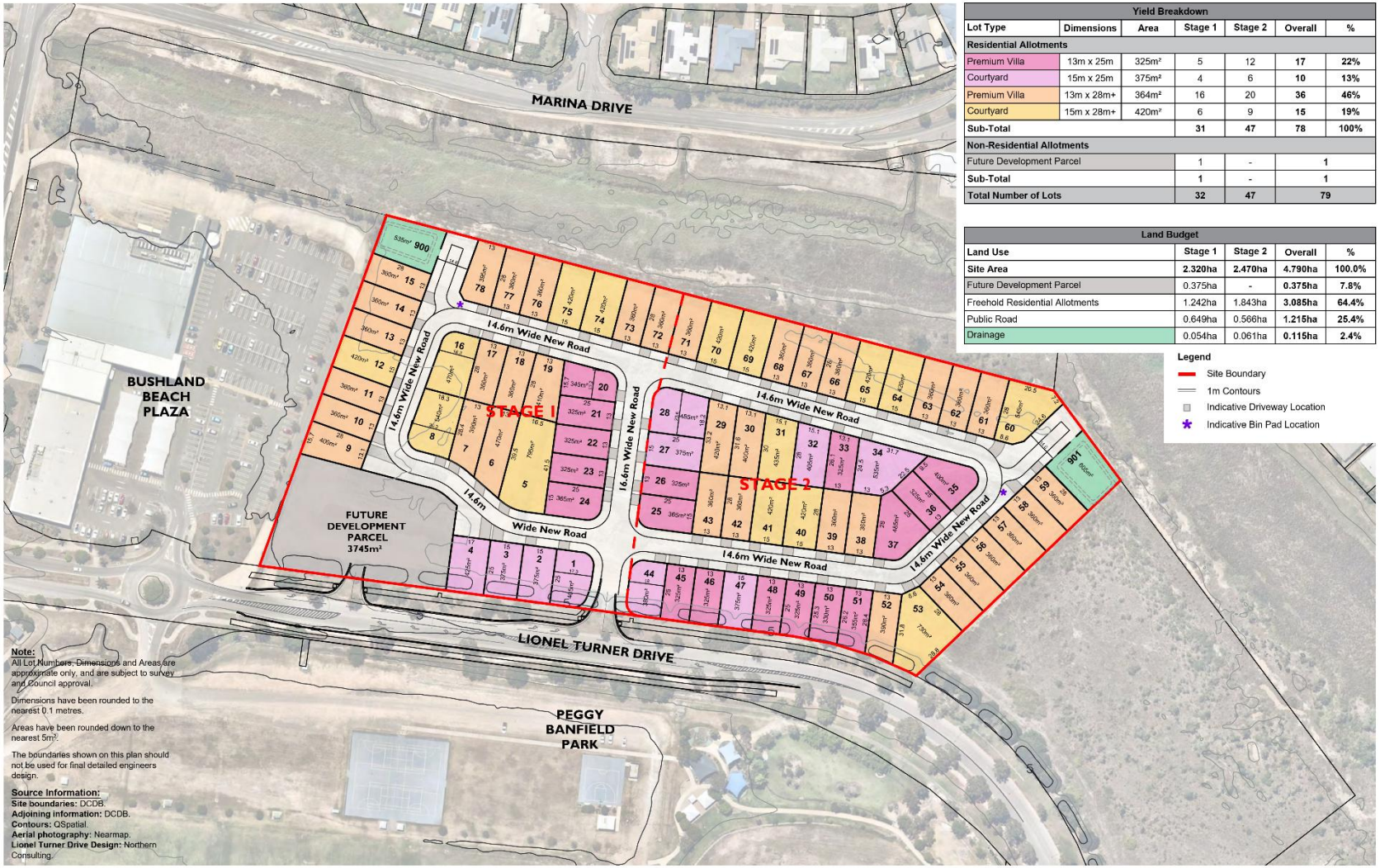
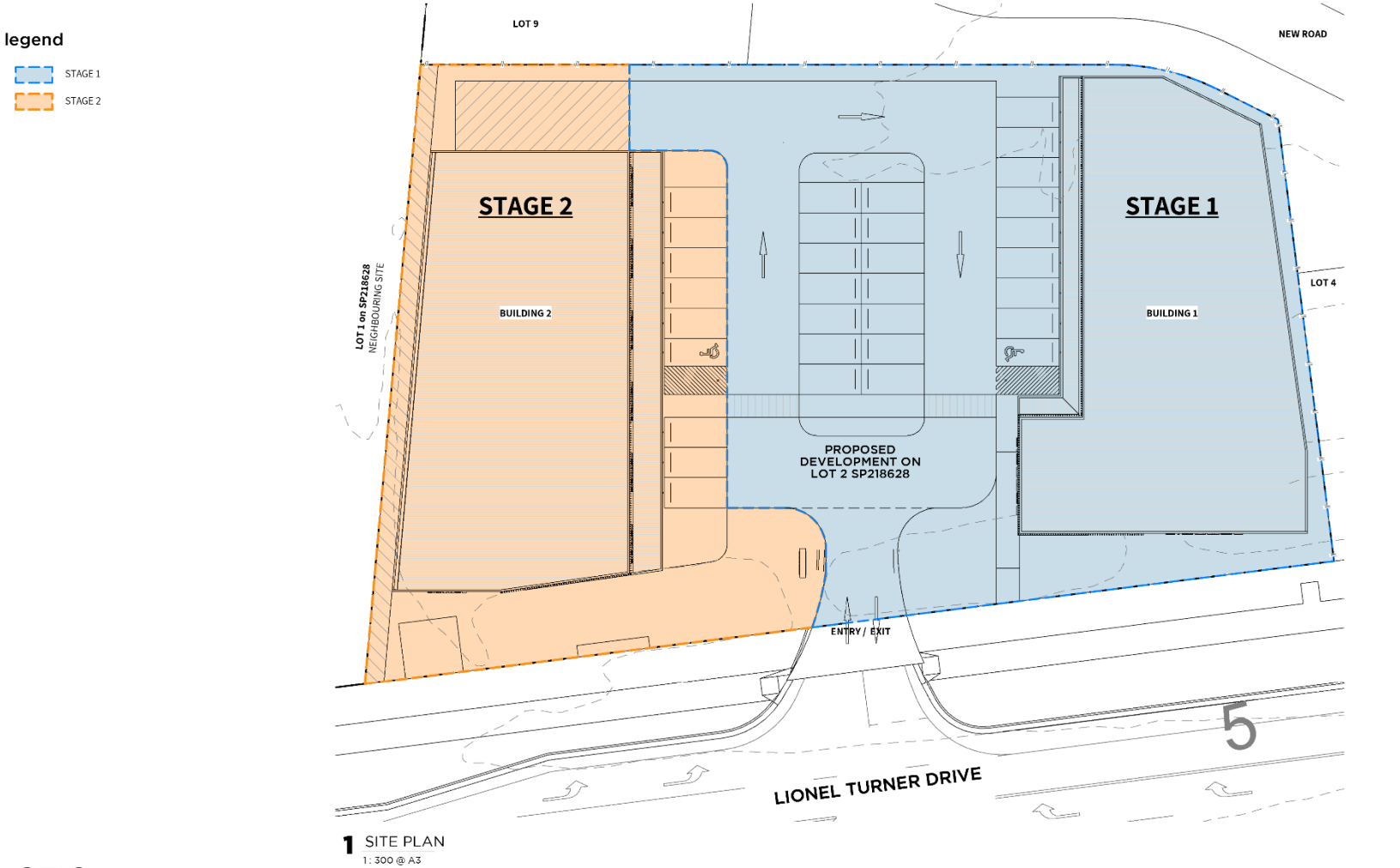


Yield Breakdown						
Lot Type	**Dimensions**	**Area**	**Stage 1**	**Stage 2**	**Overall**	**%**
Residential Allotments						
Premium Villa	13m x 25m	325m²	5	12	**17**	**22%**
Courtyard	15m x 25m	375m²	4	6	**10**	**13%**
Premium Villa	13m x 28m+	364m²	16	20	**36**	**46%**
Courtyard	15m x 28m+	420m²	6	9	**15**	**19%**
Sub-Total			**31**	**47**	**78**	**100%**
Non-Residential Allotments						
Future Development Parcel			1	-	**1**	
Sub-Total			**1**	-	**1**	
Total Number of Lots			**32**	**47**	**79**	

Land Budget				
Land Use	**Stage 1**	**Stage 2**	**Overall**	**%**
Site Area	**2.320ha**	**2.470ha**	**4.790ha**	**100.0%**
Future Development Parcel	0.375ha	-	**0.375ha**	**7.8%**
Freehold Residential Allotments	1.242ha	1.843ha	**3.085ha**	**64.4%**
Public Road	0.649ha	0.566ha	**1.215ha**	**25.4%**
Drainage	0.054ha	0.061ha	**0.115ha**	**2.4%**

LIONEL TURNER DRIVE, BUSHLAND BEACH, QLD 4818



1 SITE PLAN
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CPO ARCHITECTS

SWANLAND GROUP

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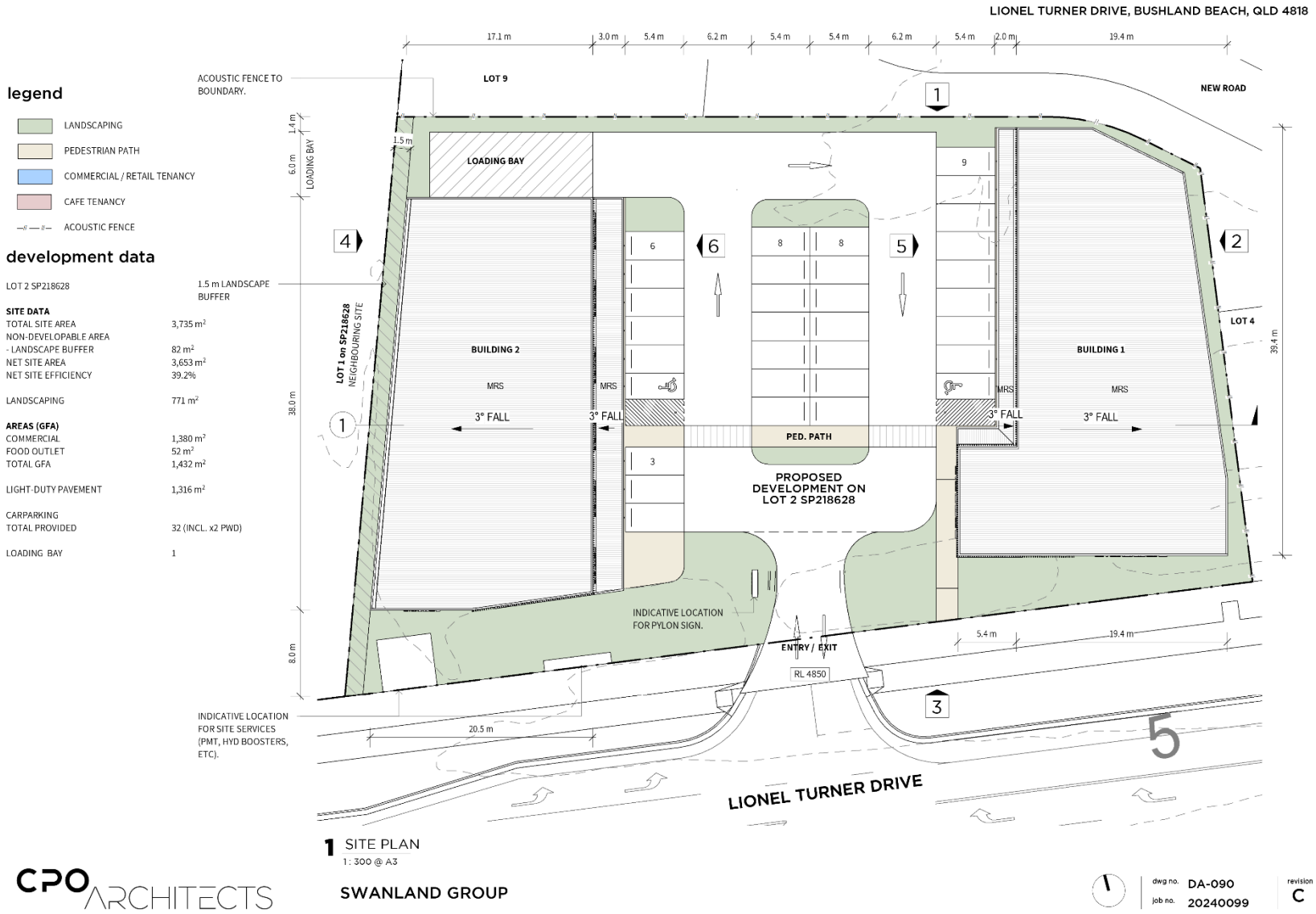
job no. 20240099
revision A



1 GROUND PLAN
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SWANLAND GROUP

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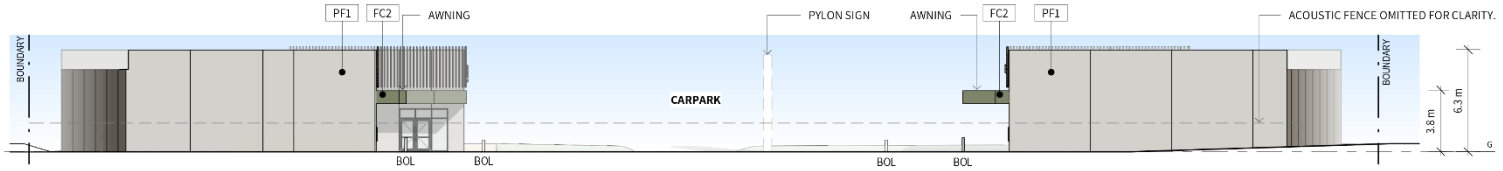
job no. 20240099
revision C

LIONEL TURNER DRIVE, BUSHLAND BEACH, QLD 4818



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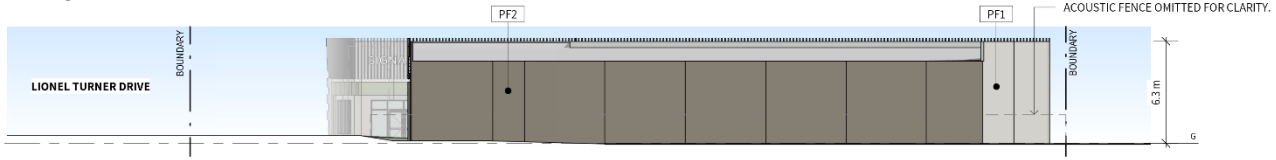

2 SITE ELEVATION B
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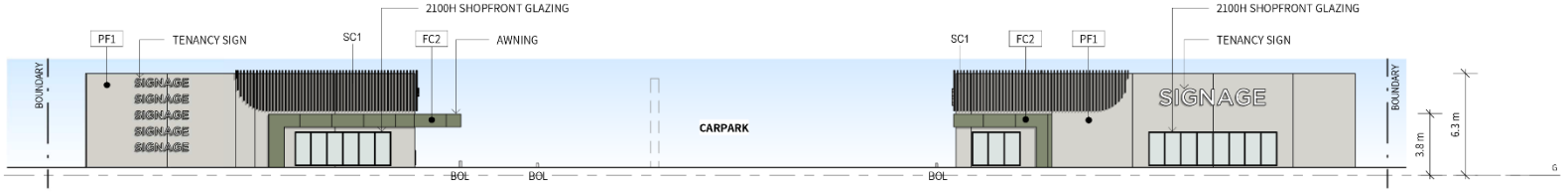

3 SITE ELEVATION C
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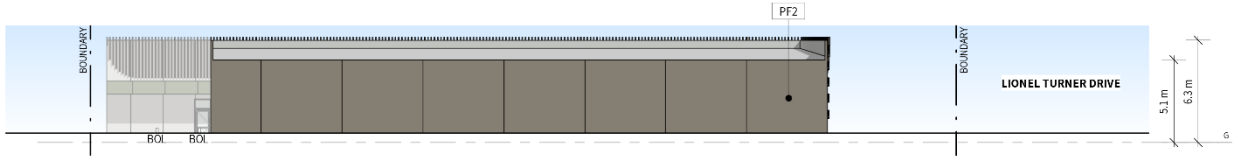

4 SITE ELEVATION D
1 : 250 @ A3

legend

FC1	FEATURE CLADDING - TYPE 1
FC2	FEATURE CLADDING - TYPE 2
PF1	CONCRETE TILT PANEL - PAINT FINISH TYPE 1
PF2	CONCRETE TILT PANEL - PAINT FINISH TYPE 2
MRS	METAL ROOF SHEETING
SC1	VERTICAL SCREEN BATTEN

CPO ARCHITECTS

SWANLAND GROUP

dwg no. DA-300
job no. 20240099
revision C

LIONEL TURNER DRIVE, BUSHLAND BEACH, QLD 4818

5 INTERNAL SITE ELEVATION A
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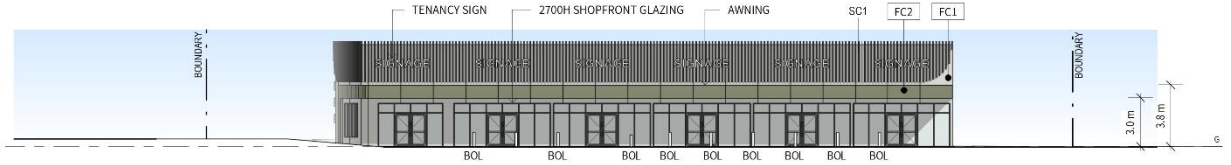

6 INTERNAL SITE ELEVATION B
1 : 250 @ A3

legend

FC1	FEATURE CLADDING - TYPE 1
FC2	FEATURE CLADDING - TYPE 2
PF1	CONCRETE TILT PANEL - PAINT FINISH TYPE 1
PF2	CONCRETE TILT PANEL - PAINT FINISH TYPE 2
MRS	METAL ROOF SHEETING
SC1	VERTICAL SCREEN BATTEN

CPO ARCHITECTS

SWANLAND GROUP

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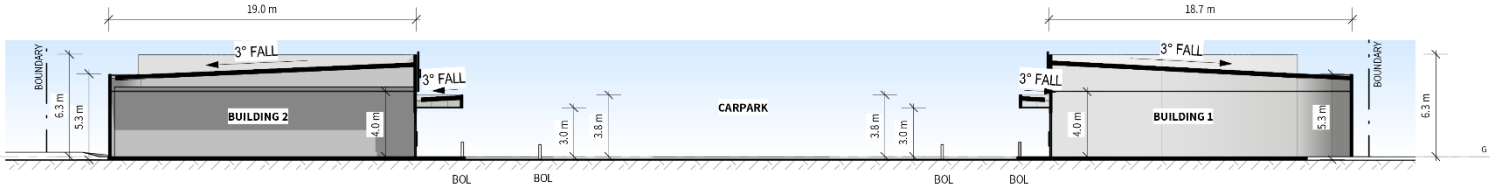
job no. 20240099

revision C

LIONEL TURNER DRIVE, BUSHLAND BEACH, QLD 4818



1 SECTION A
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CPO ARCHITECTS

SWANLAND GROUP

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revision C

Appendix D

Noise Barrier Specifications

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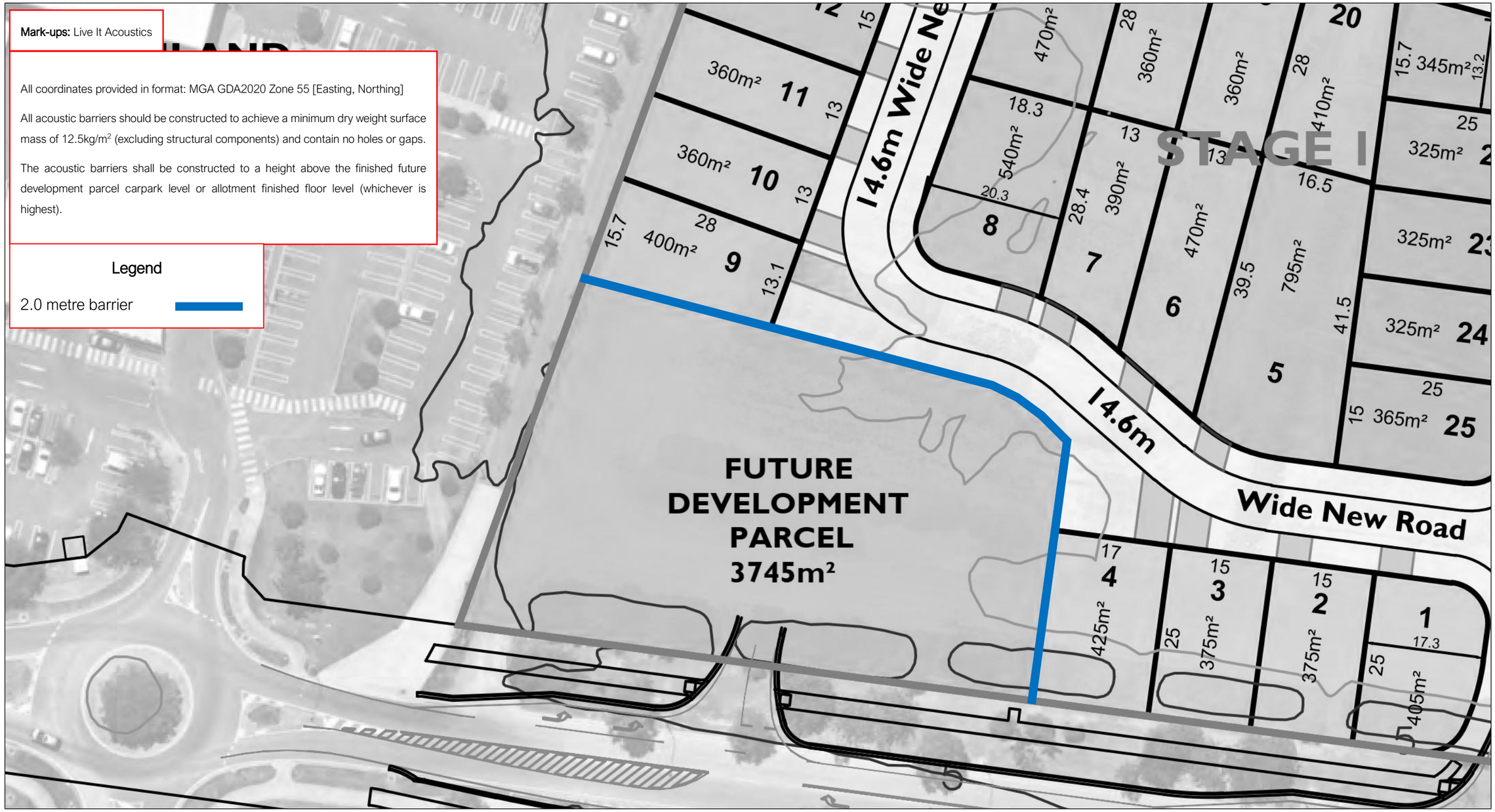

Appendix E

QDC MP4.4 Schedule 1 & 2

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Table 14. QDC MP4.4 - Schedule 1

Noise category	Minimum transport noise reduction (dBA) required for habitable rooms	Component of building's external envelope	Minimum Rw required for each component
Category 4	40	Glazing	43
		External walls	52
		Roof	45
		Floors	51
		Entry doors	35
Category 3	35	Glazing	38 (where the total area of glazing for a habitable room is greater than 1.8m^2)
		Glazing	35 (where the total area of glazing for a habitable room is less than or equal 1.8m^2)
		External walls	47
		Roof	41
		Floors	45
		Entry doors	33
Category 2	30	Glazing	35 (where the total area of glazing for a habitable room is greater than 1.8m^2)
		Glazing	32 (where the total area of glazing for a habitable room is less than or equal 1.8m^2)
		External walls	41
		Roof	38
		Floors	45
		Entry doors	33
Category 1	25	Glazing	27 (where the total area of glazing for a habitable room is greater than 1.8m^2)
		Glazing	24 (where the total area of glazing for a habitable room is less than or equal 1.8m^2)
		External walls	35
		Roof	35
		Entry doors	28
Category 0	No additional acoustic treatment required – standard building assessment provisions apply.		

Table 15. QDC MP4.4 - Schedule 2

Component of building's external envelope	Minimum Rw	Acceptable forms of construction
Glazing	43	Double glazing consisting of two panes of minimum 5mm thick glass with at least 100mm air gap and full perimeter acoustically rated seals.
	38	Minimum 14.38mm thick laminated glass, with full perimeter acoustically rated seals; OR Double glazing consisting of one pane of minimum 5mm thick glass and one pane of minimum 6mm thick glass with at least 44mm air gap, and full perimeter acoustically rated seals.
	35	Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.
	32	Minimum 6.38mm thick laminated glass with full perimeter acoustically rated seals.
	27	Minimum 4mm thick glass with full perimeter acoustically rated seals.
	24	Minimum 4mm thick glass with standard weather seals.
External Walls	52	52 Two leaves of clay brick masonry, at least 270mm in total, with subfloor vents fitted with noise attenuators.
	47	Two leaves of clay brick masonry at least 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) 50mm thick mineral insulation or 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 20kg/m3 in the cavity. OR Two leaves of clay brick masonry at last 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) at least 13mm thick cement render on each face OR Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) Mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m3 positioned between studs; and (iii) One layer of plasterboard at least 13mm thick fixed to outside face of studs. OR Single leaf of minimum 150mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.
	41	Two leaves of clay brick masonry at least 110mm thick with cavity not less than 50mm between leaves OR Single leaf of clay brick masonry at last 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m3 positioned between studs; and (iii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR

Component of building's external envelope	Minimum Rw	Acceptable forms of construction
		Single leaf of brick masonry at least 110mm thick with at least 13mm thick render on each face OR Concrete brickwork at least 110mm thick OR In-situ concrete at least 100mm thick OR Precast concrete at least 100mm thick and without joints
	35	Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally.
Roof	45	Concrete or terracotta tile or sheet metal roof with sarking, acoustically rated plasterboard ceiling at least 13mm thick fixed to ceiling joists, cellulose fibre insulation at least 100mm thick with a density of at least 45kg/m3 in the cavity. OR Concrete or terracotta tile or sheet metal roof with sarking, 2 layers of acoustically rated plasterboard at least 16mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m3 or polyester insulation at least 50mm thick with a density of at least 20kg/m3 in the cavity.
	41	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m3 or polyester insulation at least 50mm thick with a density of at least 20kg/m3 in the cavity. OR Concrete suspended slab at least 100mm thick.
	38	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m3.
	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.
Floors	51	Concrete slab at least 150mm thick.
	45	Concrete slab at least 100mm thick OR Tongued and grooved boards at least 19mm thick with: (i) timber joists not less than 175mm x 50mm; and (ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m3 positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists;nand (iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m3 laid over entire floor, including tops of joists before flooring is laid; and

Component of building's external envelope	Minimum Rw	Acceptable forms of construction
		(iv) secured to battens at least 75mm x 50mm; and (v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.
Entry Doors	35	Solid core timber not less than 45mm thick, fixed so as to overlap the frame or rebate of the frame by not less than 10mm, with full perimeter acoustically rated seals.
	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or (ii) acoustically laminated glass not less than 10.38mm thick
	28	Fixed so as to overlap the frame or rebate of the frame, constructed of - (i) Wood, particleboard or blockboard not less than 33mm thick; or (ii) Compressed fibre reinforced sheeting not less than 9mm thick; or (iii) Other suitable material with a mass per unit area not less than 24.4kg/m2; or (iv) Solid core timber door not less than 35mm thick fitted with full perimeter acoustically rated seals.