acousticworks

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1602

Date: 27 May 2025

Queensland Government

Proposed Residential Development
Site 18B 260 Macarthur Avenue
Hamilton

ACOUSTIC REPORT




Client:
Silverstone Developments
ATTN: Wade Fraser

Reference:
2025154 R01A Lot 18B Macarthur Avenue Hamilton ENV ACN.docx

Date Issued:
24 April 2025

Document Information

Contact Details

Acoustic Works
Unit 17/10 Benson Street
Toowong QLD 4066
(07) 3393 2222
ABN: 56 157 965 056

PO Box 69
Toowong DC
QLD 4066

Greg Pearce
Email: gpearce@acousticworks.com.au

Mark Enersen
Email: menersen@acousticworks.com.au

Report Register

Date	Revision	Author	Reviewer	Manager
24/04/2025	R01A	David Dadd	Greg Pearce	GP

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL
Approval no: DEV2025/1602
Date: 27 May 2025
Queensland Government

Disclaimer

Reports produced by Acoustic Works are prepared for a particular Client's objective and are based on a specific scope, conditions and limitations, as agreed between Acoustic Works and the Client. Under no circumstances shall information and/or report(s) prepared by Acoustic Works be used by other parties other than the Client without first obtaining written permission from Acoustic Works.

TABLE OF CONTENTS

1.Introduction 5
2.Site Description 5
2.1 Site Location 5
2.2 Proposal 6
2.3 Acoustic Environment 7
3.Equipment 7
4.Receivers, Industrial and Noise Monitoring Locations 8
4.1 Receiver Locations 8
4.2 Industrial Land Use Locations 9
4.3 Unattended Ambient Noise Monitoring 10
4.4 Attended Aircraft Noise Measurements 10
4.5 Attended Offsite Industrial Noise Measurements 10
5.Measured Noise Levels 11
5.1 Meteorological Conditions 11
5.2 Ambient Noise Levels 11
6.Noise Criteria 12
6.1 Brisbane City Council (BCC) - Environmental Noise Criteria 12
6.1.1 Intrusive Noise and Acoustic Amenity 12
6.1.2 Night-Time Noise 13
6.1.3 Mechanical Plant 14
6.2 Aircraft Noise 14
7.Environmental Assessment 16
7.1 Onsite Activities 16
7.1.1 Intrusive Noise and Acoustic Amenity 16
7.1.2 Night-time Noise 17
7.2 Offsite Industrial Activities 18
7.2.1 Intrusive Noise, Acoustic Amenity & Night Time LAmax 18
8.Aircraft Assessment 20
8.1 Attended Aircraft Noise Measurements 20
9.Recommendations 21
9.1 Unit Façade Construction 21
9.1.1 Unit Glazing 21
9.1.2 Unit Wall Construction 22
9.1.3 Unit Roof Construction 22
9.2 Gym Façade Construction 22
9.2.1 Gym Glazing 22
9.2.2 Gym Wall Construction 23
9.2.3 Gym Roof/Ceiling Construction 23
9.2.4 Gym Entry Doors 23
9.3 Mechanical Ventilation 23
9.4 Onsite Activities 24
9.4.1 Onsite Mechanical Plant 24
9.5 Offsite Activities 24
10. Conclusion 25
11. Appendices 26
11.1 Development Plans 26
11.2 Noise Monitoring Charts 33

TABLE INDEX

Table 1: Meteorological Conditions – Brisbane 11
Table 2: Measured Ambient Noise Levels – All Time Periods 11
Table 3: Noise (Planning) Criteria 12
Table 4: Noise (Planning) Criteria – Multiple Dwelling Code 12
Table 5: Intrusive Noise Criteria 13
Table 6: Acoustic Amenity Criteria 13
Table 7: Night-time Noise Criteria 13
Table 8: Applicable Night-time Noise Criteria 13
Table 9: Applicable Noise Criteria 14
Table 10: Aircraft Noise Internal Criteria 15
Table 11: Average Noise Levels from Site Activities 16
Table 12: Lmax Noise Levels from Site Activities 17
Table 13: Offsite Industrial Noise Levels 18
Table 14: Noise Levels from Offsite Industrial Activities 18
Table 15: Noise Levels from Offsite Industrial Activities (Vaxxas) 19
Table 16: Measured Aircraft Noise Levels 20
Table 17: Glazing Treatments for Aircraft Noise Impacts 21
Table 18: Gym Glazing Treatments 22
Table 19: Gym Wall Construction 23
Table 20: Gym Roof Construction 23
Table 21: Gym Entry Door Construction 23

FIGURE INDEX

Figure 1: Site Location (Not to Scale) 5
Figure 2: Receivers and Noise Monitoring Locations 8
Figure 3: Offsite Industrial Premises 9
Figure 4: Site Location – ANEF Contour 15

1. Introduction

This report is in response to a request by Silverstone Developments for an aircraft and environmental noise assessment of a proposed residential development to be located at Site 18B, 260 Macarthur Avenue, Hamilton. To facilitate the assessment, noise monitoring was conducted to determine aircraft and ambient noise levels in the locality. Based on the outcomes of the assessment, recommendations for management strategies and acoustic treatments are specified.

2. Site Description

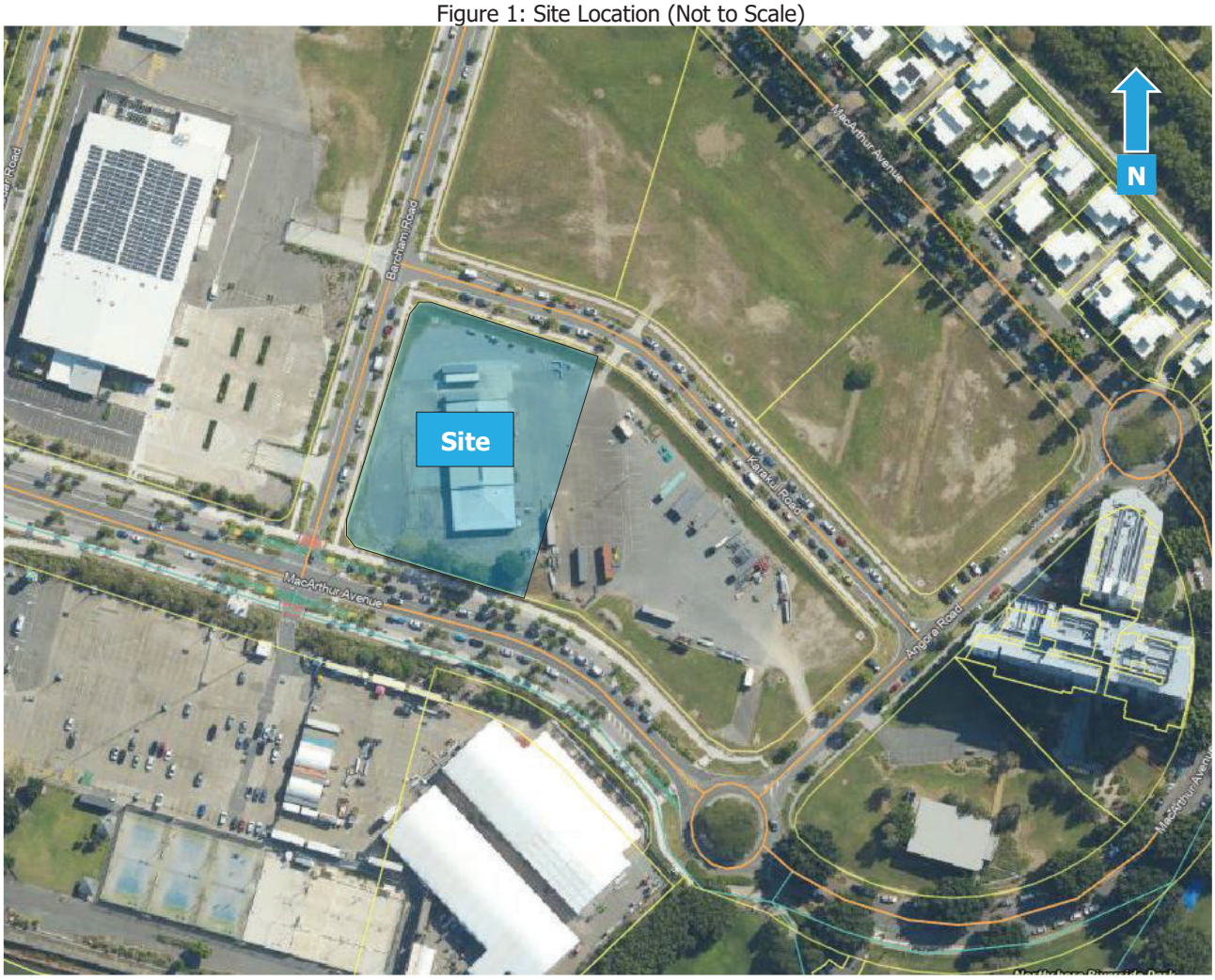
2.1 Site Location

The site is described by the following:

Site 18B 260 Macarthur Avenue, Hamilton
Lot 6 on SP326594

Refer to Figure 1 for site location.

Figure 1: Site Location (Not to Scale)



A comprehensive site survey was conducted on the 18th of August 2024 and identified the following:

a) The development site is currently vacant.
b) The surrounding area consists primarily of residential, warehousing and industrial land uses.
c) Residential land uses are located across Macarthur Avenue to the north and across Angora Road to the southeast.

2.2 Proposal

The proposal is to construct two residential apartment buildings (253 apartments in total) as follows:

- Basement level carparking:
  - 186 spaces servicing both Building 3 and Building 4.
  - Pump room, water tanks and storage rooms.

- Ground floor:
  - Residential apartments.
  - 57 car spaces.
  - 328 bicycle spaces.
  - Mail room, coworking room, waste rooms, storeroom and lobbies.

- Level 1:
  - Residential apartments.
  - Water tanks and storerooms.
  - 92 car spaces.

- Levels 2:
  - Residential apartments.
  - Lawn areas.
  - Pool, gym and wellness centre.

- Levels 3-12:
  - Residential apartments.

- Levels 13-16:
  - Residential apartments (Building 3 only).

- Level 17:
  - Terrace area, communal dining and lounge, kitchen, WC and storage room (Building 3 only).

Refer to the Appendices for development plans.

2.3 Acoustic Environment

The surrounding area is primarily affected local road traffic noise and aircraft noise associated with Brisbane Airport.

3. Equipment

The following equipment was used to record noise levels:

- Rion NL42 Environmental Noise Monitor.
- Norsonic NOR140 Sound Level Meter.
- BSWA Technology Co. Ltd Sound Calibrator.

The Rion NL42 Environmental Noise Monitors hold current NATA Laboratory Certification and were field calibrated before and after the monitoring period, with no significant drift from the reference signal recorded.

4. Receivers, Industrial and Noise Monitoring Locations

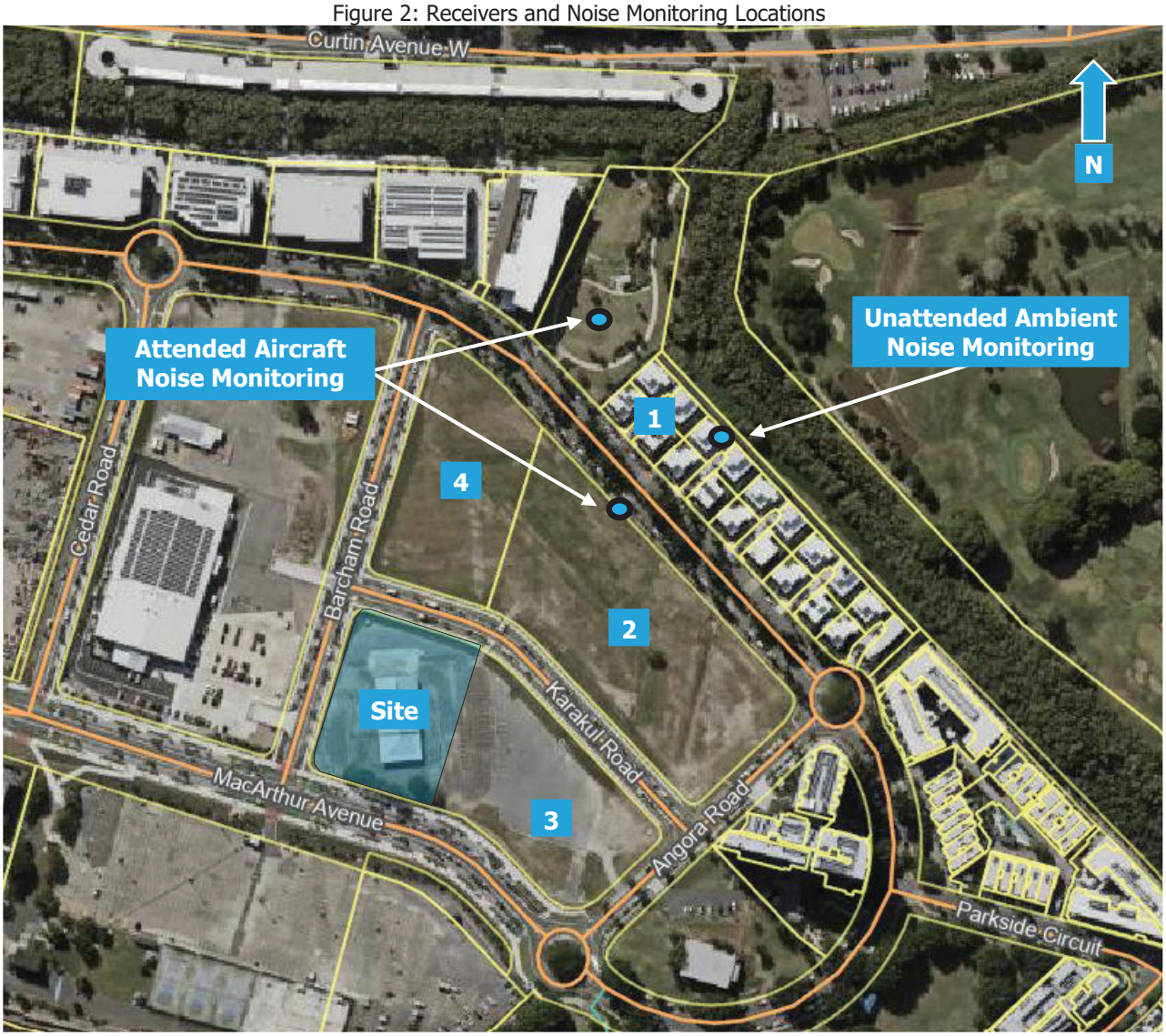
4.1 Receiver Locations

The nearest sensitive receiver locations were identified as follows:

1. Two storey residential dwellings are located to the northeast of the site at 341 Macarthur Avenue (emerging community zone).
2. Located to the east at 280 Macarthur Avenue is a proposed aged care facility (emerging community zone).
3. A residential development is currently under development to the east at 280 Macarthur Avenue (emerging community zone).
4. Located to the north at 280 Macarthur Avenue is a proposed residential development (emerging community zone).

These locations were chosen as being representative of the nearest sensitive receivers to the proposed development. Refer to Figure 2 for these locations.

Figure 2: Receivers and Noise Monitoring Locations



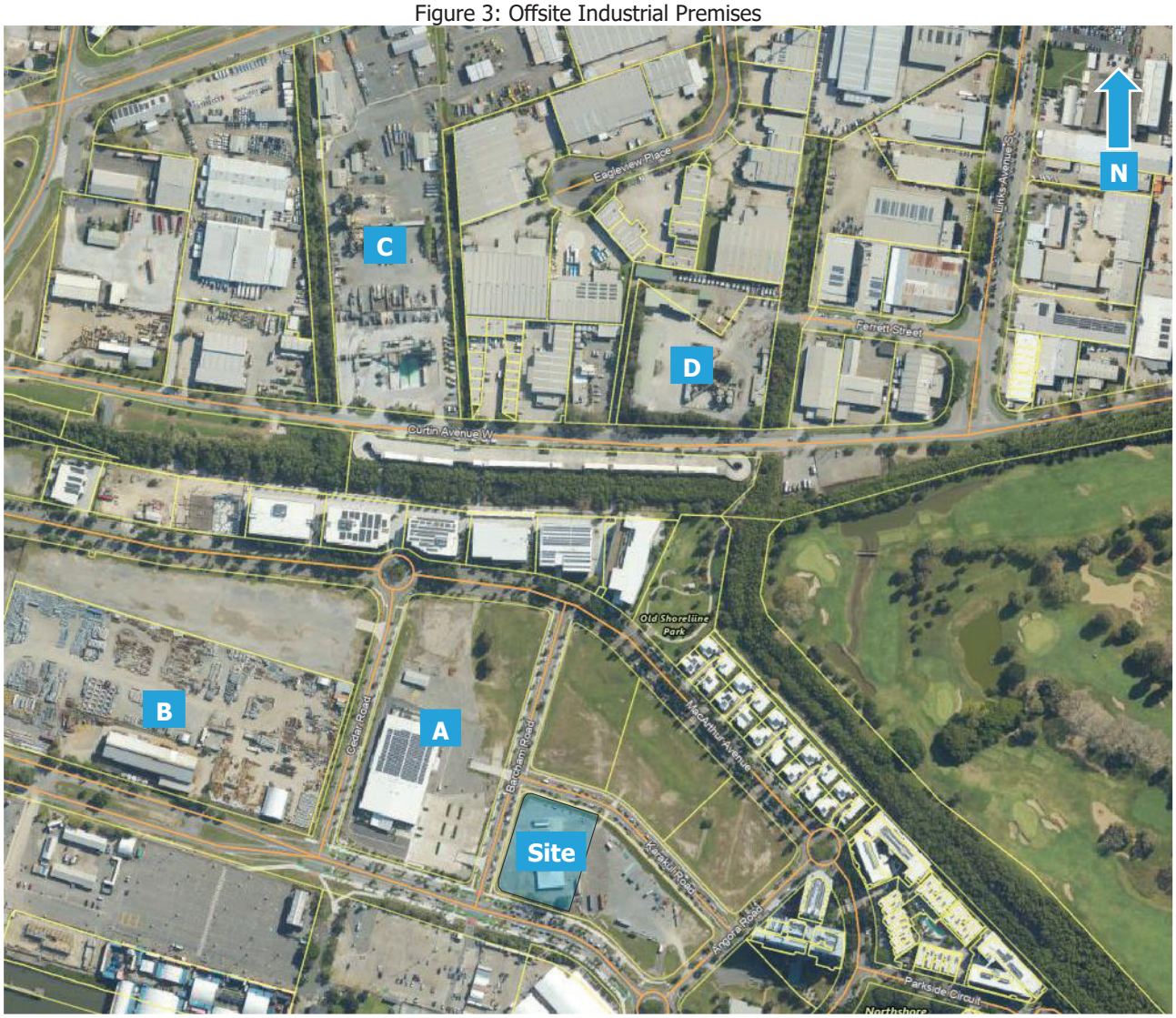
4.2 Industrial Land Use Locations

Industrial activities occurring within 500m of the site have been considered. The nearest offsite premises with the potential to adversely impact the acoustic amenity of the proposed development were identified as follows:

A. Located to the west of the site at 240 Macarthur Avenue is 'Vaxxas Biomedical Facility'.
B. 'C.P. Plating' is located at 222a Macarthur Avenue to the west of the site.
C. Located to the northwest of the site at 208 Curtin Avenue and 111 Cullen Avenue is 'Boral Concrete' and 'Boral Asphalt' respectively.
D. 'Brisbane Cityworks' is located to the north of the site at 260 Curtin Avenue

These locations were identified to have the potential to adversely impact proposed onsite noise sensitive receivers.

Figure 3: Offsite Industrial Premises



4.3 Unattended Ambient Noise Monitoring

A Rion NL42 environmental noise monitor was placed in the rear yard of 6/341 Macarthur Avenue to measure ambient noise levels. This location was selected as it was considered being representative of the nearest residential receivers. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between the 10th and 17th of July 2024.

The environmental noise monitor was set to record noise levels in "A" Weighting, Fast response using 15 minute statistical intervals. Ambient noise monitoring was conducted generally in accordance with Australian Standard AS1055:2018 *Acoustics – Description and measurement of environmental noise*.

Refer to Figure 2 for noise monitoring location.

4.4 Attended Aircraft Noise Measurements

Aircraft noise levels were measured in the immediate vicinity of the site at 351 Macarthur Avenue and at the northern site boundary at 330 Macarthur Avenue in free field locations. The attended noise monitoring was conducted on the 10th and 18th of July 2024.

The sound level meter was set to record noise levels in octave band, linear weighting, slow response, and broadband "A" weighting, slow response. The typical duration for each measurement was between 20 and 30 seconds. Aircraft noise measurements were conducted in accordance with Australian Standard AS2021:2015.

Refer to Figure 2 for the measurement locations.

4.5 Attended Offsite Industrial Noise Measurements

Acoustic Works conducted attended measurements of industrial land uses in the vicinity of the site on Tuesday the 11th of February 2025 between the hours of 2.30pm and 4:30pm to assess noise impacts from the surrounding industrial land uses on the proposed development site. The sound level meter was set to record noise levels in "A" Weighting, Fast response mode.

Refer to Figure 3 for the location of industrial land uses.

5. Measured Noise Levels

The following tables present the measured background noise levels from the unattended noise survey and meteorological conditions.

5.1 Meteorological Conditions

Meteorological observations during the unattended noise monitoring survey were obtained from the Bureau of Meteorology website (http://www.bom.gov.au/climate/data), shown in Table 1 below.

Table 1: Meteorological Conditions – Brisbane

Day	Date	Rainfall (mm)	Wind			
			9am		3pm	
			Speed (km/h)	Direction	Speed (km/h)	Direction
Wednesday	10/07/2024	0	6	WSW	7	W
Thursday	11/07/2024	0	7	WSW	4	ESE
Friday	12/07/2024	0	4	SSW	13	W
Saturday	13/07/2024	0	7	W	17	WSW
Sunday	14/07/2024	0	11	WSW	13	WNW
Monday	15/07/2024	0	4	SW	13	W
Tuesday	16/07/2024	0	9	WSW	20	W
Wednesday	17/07/2024	0	17	W	17	W

5.2 Ambient Noise Levels

The ambient noise levels measured at the monitoring location are as follows:

Table 2: Measured Ambient Noise Levels – All Time Periods

Day	Date	L90 dB(A) (Rating Background Level)			LAeq 9hr
		Day	Evening	Night	Night
Wednesday	10/07/2024	38	44	40	-
Thursday	11/07/2024	41	42	38	51
Friday	12/07/2024	38	43	37	51
Saturday	13/07/2024	38	38	33	49
Sunday	14/07/2024	35	39	31	49
Monday	15/07/2024	40	39	34	50
Tuesday	16/07/2024	43	40	41	53
Wednesday	17/07/2024	44	-	39	-
Overall value		40	40	36	50

Refer to the appendix for a graphical representation of the measured noise levels.

6. Noise Criteria

6.1 Brisbane City Council (BCC) - Environmental Noise Criteria

To ensure a reasonable acoustic amenity is maintained, Brisbane City Council requires environmental noise be assessed in accordance with Noise Impact Assessment PSP (2014). To accurately assess environmental noise, the noise must first be classified as to the type and its duration. Sections 6.1.1 to 6.1.4 breaks down the assessment requirements in relation to the project and considers the criteria in relation to the type of noise being assessed.

6.1.1 Intrusive Noise and Acoustic Amenity

To ensure a reasonable amenity is maintained, the following criteria shall be applied for the assessment of onsite activities to sensitive receivers. The noise criteria as applied by Brisbane City Council in accordance with the Multiple Dwelling Code of the Brisbane City Plan 2014 are as follows:

Table 3: Noise (Planning) Criteria

Criteria Location	Intrusive Noise Criteria	Acoustic Amenity Criteria		
	Day, evening and night $L_{Aeq,adj,T}$ are not greater than the RBL plus the value in this column for the relevant criteria location, where T equals: • Day - 11hr • Evening - 4hr • Night - 9hr	Day, evening and night $L_{Aeq,adj,T}$ are not greater than the values in the column below for the relevant criteria location, where T equals: • Day - 11hr • Evening - 4hr • Night - 9hr		
		Day	Evening	Night
Emerging community zone boundary	5 dB(A)	55 dB(A)	50 dB(A)	45 dB(A)

Further reference is made to PO21 and AO21 of the Brisbane City Council City Plan 2014 Multiple Dwelling Code.

Table 4: Noise (Planning) Criteria – Multiple Dwelling Code

Performance Outcome	Acceptable Outcome
PO21 Development in a zone in the centre zones category or Mixed use zone must: a. be located, designed and constructed to protect bedrooms and other habitable rooms from exposure to noise arising from non-residential activities outside the building; b. be designed and constructed to achieve a minimum reduction in sound pressure level between the exterior of the building and the bedrooms or indoor primary living areas of 30dBA. 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. Note – Site-specific criteria will be identified in a neighbourhood plan for sites within a Special Entertainment Precinct or within the Transport noise corridor overlay.	**AO21** Development in a zone in the centre zones category or the Mixed use zone has a minimum acoustic performance of: a. Rw 35 for glazing (windows and doors) where total area of glazing is greater than 1.8m^2. b. Rw 32 for glazing (windows and doors) where total area of glazing is less than or equal to 1.8m^2.

The noise criteria applicable to this development are as follows:

Table 5: Intrusive Noise Criteria

Time Period	Measured RBL $L_{A90,T}$	Intrusive Criteria dB(A) (RBL L_{A90} + 5 dB(A))
Day 7am – 6pm	40	45
Evening 6pm – 10pm	40	45
Night 10pm – 7am	36	41

Table 6: Acoustic Amenity Criteria

Time Period	Acoustic Amenity Criteria ($L_{Aeq,adj,T}$ dB(A))
Day 7am – 6pm	55
Evening 6pm – 10pm	50
Night 10pm – 7am	45

6.1.2 Night-Time Noise

The night-time noise criteria as applied by Brisbane City Council in accordance the Brisbane City Plan 2014 are as follows:

Table 7: Night-time Noise Criteria

Criteria Location	Where the existing $L_{Aeq,9hr\ night}$ at the criteria location is:	Average of the highest 15 single L_{Amax} events over a given night (10pm-7pm) period is not greater than the following values at the relevant criteria location	The absolute highest single L_{Amax} event over a given night (10pm-7am) period is not greater than the following values at the relevant criteria location
Emerging community zone boundary	< 45dB(A)	50dB(A)	55dB(A)
	45 to 60dB(A)	$L_{eq,9hr\ night}$ + 5dB(A)	$L_{eq,9hr\ night}$ + 10dB(A)
	> 60dB(A)	65dB(A)	70dB(A)

Based on the measured noise levels in Section 5 the night-time noise criteria is as follows:

Table 8: Applicable Night-time Noise Criteria

Criteria Location	Measured $L_{Aeq,9h\ night}$ dB(A)	Criteria Average L_{Amax} dB(A)	Criteria Highest L_{Amax} dB(A)
Emerging community zone boundary	50	55	60

6.1.3 Mechanical Plant

Development that includes mechanical plant (including air-conditioning plant, heat pumps and swimming pool pumps) ensures it is located, designed and attenuated to achieve the following criteria:

> *$L_{Aeq,adj,T}$ emitted from mechanical plant is not greater than the rating background level plus 3 at a sensitive use not associated with the development.*
>
> *Where T is:*
>
> - *(7am to 6pm): 11hr*
> - *(6pm to 10pm): 4hr*
> - *(10pm to 7am): 9hr*
>
> *Where $L_{Aeq,adj,T}$* is the A-weighted equivalent continuous sound pressure level during measurement time T, adjusted for tonal and impulsive noise characteristics, determined in accordance with the methodology described in the Noise impact assessment planning scheme policy.

The noise criteria applicable to this development are as follows:

Table 9: Applicable Noise Criteria

Time Period	Criteria dB(A) (RBL L_{90} + 3 dB(A))
Day 7am – 6pm	43
Evening 6pm – 10pm	43
Night 10pm – 7am	39

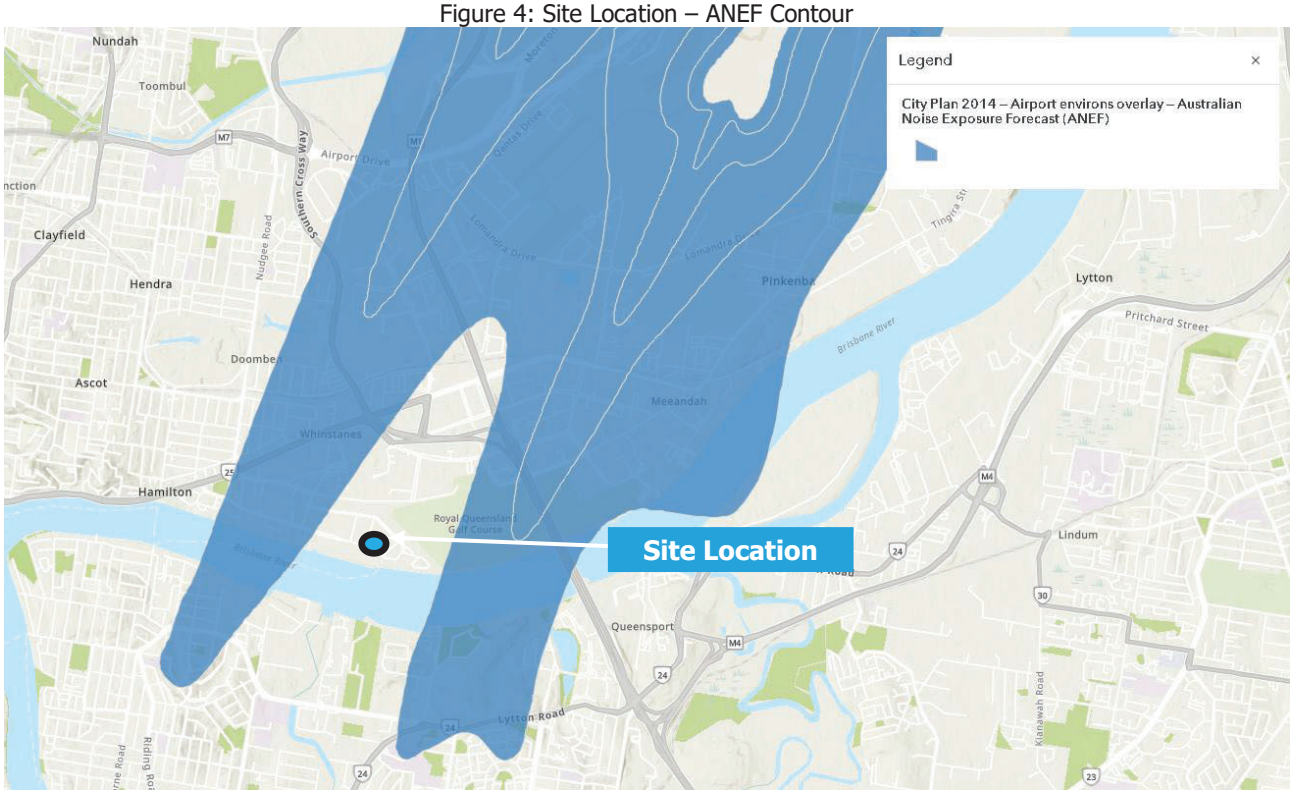
6.2 Aircraft Noise

As per AS2021:2015 *"Acoustics - Aircraft Noise Intrusion - Building Siting and Construction for the Assessment of Aircraft Noise"*, the actual location of the 20 ANEF contour is difficult to define accurately. As a result, aircraft noise may still be assessed for building sites outside but near to the 20 ANEF contour.

The requirement for assessment of aircraft noise comes under the Brisbane City Plan 2014, in accordance with AS2021:2015 *"Acoustics - Aircraft Noise Intrusion - Building Siting and Construction for the Assessment of Aircraft Noise"*.

As seen in Figure 4, the site is located outside the ANEF 20-25 noise contour for Brisbane Airport however, to ensure the proposed development isn't adversely impacted, aircraft noise was assessed utilising attended aircraft noise measurements.

Figure 4: Site Location – ANEF Contour



The indoor design sound levels for residential developments are contained in Table 3.3 of AS2021:2015. The indoor design sound levels are as follows:

Table 10: Aircraft Noise Internal Criteria

Use	Activity of Internal Space	Indoor Design Sound Level L_{Amax} 'S' Time Weighting
Multiple Dwelling	Sleeping areas	50dB(A)
	Other habitable rooms	55dB(A)
	Bathrooms, toilets, laundries	60 dB(A)

7. Environmental Assessment

7.1 Onsite Activities

Noise associated with the development was assessed based on previous measurements of similar activities. The calculations assume that the nominated activities are located at the closest representative point to the development site. Any relevant shielding, building transmission loss or recommended acoustic screens are taken into account for these activities.

7.1.1 Intrusive Noise and Acoustic Amenity

The noise source levels and predicted impacts at the nearest receiver locations are shown in Table 11 as follows. L_{Aeq} results are not shown where the calculated total is less than 0dBA.

Table 11: Average Noise Levels from Site Activities

Receiver	Receivers / Description	Source @1m dB(A)	Correction dB(A)*	Corrected dB(A)	Number of events day	Number of events eve	Number of events night	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building TL or shield dB	Room Correction dB	Dist atten. @-6dB/dd	LAeq adj,T ext. dB(A) Day	LAeq adj,T ext. dB(A) Eve	LAeq adj,T ext. dB(A) Night	Intrusive Compliance LAeq Day	Intrusive Compliance LAeq Eve	Intrusive Compliance LAeq Night	Amenity Compliance LAeq Day	Amenity Compliance LAeq Eve	Amenity Compliance LAeq Night
	1. 341 Macarthur Avenue (NE) 2. 280 Macarthur Avenue (E) 3. 280 Macarthur Avenue (E) 4.280 Macarthur Avenue (N)																						
	Criteria																	45	45	41	55	50	45
1	Car door closure	75	2	77	200	100	50	2	159			-22		-44.028				Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	200	100	50	15	159			-22		-44.028				Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	200	100	50	2	159			-22		-44.028				Yes	Yes	Yes	Yes	Yes	Yes
	Gym activities	80		80	11	4	9	3600	204			-24		-46.193	10	10	10	Yes	Yes	Yes	Yes	Yes	Yes
	Recreation area - Include pool	78		78	11	4		3600	188			-22		-45.483	11	11		Yes	Yes	n/a	Yes	Yes	n/a
	Outdoor dining group (Rooftop)	75		75	11	4		3600	204					-46	29	29		Yes	Yes	n/a	Yes	Yes	n/a
	Waste collection	94	2	96	1			240	210			-22		-46.444	5			Yes	n/a	n/a	Yes	Yes	Yes
	Deliveries	85	2	87	1			60	183			-22		-45.249				Yes	n/a	n/a	Yes	n/a	n/a
	Total														29	29	13	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																	45	45	41	55	50	45
2	Car door closure	75	2	77	200	100	50	2	49			-22		-33.804	1	3		Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69			200	100	50	15	49			-22		-33.804				Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	200	100	50	2	49			-22		-33.804		2		Yes	Yes	Yes	Yes	Yes	Yes
	Gym activities	80		80	11	4	9	3600	91			-24		-39.181	17	17	17	Yes	Yes	Yes	Yes	Yes	Yes
	Recreation area - Include pool	78		78	11	4		3600	73			-22		-37.266	19	19		Yes	Yes	n/a	Yes	Yes	n/a
	Outdoor dining group (Rooftop)	75		75	11	4		3600	95					-40	35	35		Yes	Yes	n/a	Yes	Yes	n/a
	Waste collection	94	2	96	1			240	91			-22		-39	13			Yes	n/a	n/a	Yes	Yes	Yes
	Deliveries	85	2	87	1			60	79			-22		-38				Yes	n/a	n/a	Yes	n/a	n/a
	Total														35	35	17	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																	45	45	41	55	50	45
3	Car door closure	75	2	77	200	100	50	2	38			-22		-31.596	3	5		Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69			200	100	50	15	38			-22		-31.596				Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	200	100	50	2	38			-22		-31.596	2	4		Yes	Yes	Yes	Yes	Yes	Yes
	Gym activities	80		80	11	4	9	3600	61			-24		-35.707	20	20	20	Yes	Yes	Yes	Yes	Yes	Yes
	Recreation area - Include pool	78		78	11	4		3600	61			-22		-35.707	20	20		Yes	Yes	n/a	Yes	Yes	n/a
	Outdoor dining group (Rooftop)	75		75	11	4		3600	42					-32	43	43		Yes	Yes	n/a	Yes	Yes	n/a
	Waste collection	94			1			240	63			-22		-35.987				Yes	n/a	n/a	Yes	Yes	Yes
	Deliveries	85	2	87	1			60	75			-22		-37.501				Yes	n/a	n/a	Yes	n/a	n/a
	Total														43	43	21	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																	45	45	41	55	50	45
4	Car door closure	75	2	77	200	100	50	2	39			-22		-32	3	4		Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	200	100	50	15	39			-22		-32	4	5		Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	200	100	50	2	39			-22		-32	2	4		Yes	Yes	Yes	Yes	Yes	Yes
	Gym activities	80		80	11	4	9	3600	84			-24		-38.486	18	18	18	Yes	Yes	Yes	Yes	Yes	Yes
	Recreation area - Include pool	78		78	11	4		3600	63			-22		-35.987	20	20		Yes	Yes	n/a	Yes	Yes	Yes
	Outdoor dining group (Rooftop)	75		75	11	4		3600	91					-39.181	36	36		Yes	Yes	n/a	Yes	Yes	Yes
	Waste collection	94	2	96	1			240	78			-22		-37.842	14			Yes	n/a	n/a	Yes	n/a	Yes
	Deliveries	85	2	87	1			60	44			-22		-32.869	4			Yes	n/a	n/a	Yes	n/a	Yes
	Total														36	36	18	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS 1055:2018.

Compliance is predicted for all onsite activities on the condition the recommendations in Section 9 are implemented.

7.1.2 Night-time Noise

The maximum noise source levels were determined based on onsite measurements and previous assessments of similar activities.

Table 12: Lmax Noise Levels from Site Activities

Receiver	Receivers 1. 341 Macarthur Avenue (NE) 2. 280 Macarthur Avenue (E) 3. 280 Macarthur Avenue (E) 4.280 Macarthur Avenue (N) Description	Source @1m dB(A)	Correction dB(A)*	Corrected dB(A)	Number of events day	Number of events eve	Number of events night	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building TL or shield dB	Room Correction dB	Dist atten. @-6dB/dd	Absolute LAmax dBA	LAMax Compliance Night Max
	Criteria															60
1	Car door closure	75	2	77	200	100	50	2	159			-22		-44.028	20	Yes
	Car passby	69		69	200	100	50	15	159			-22		-44.028	12	Yes
	Car start	74	2	76	200	100	50	2	159			-22		-44.028	19	Yes
	Gym activities	80		80	11	4	9	3600	204			-24		-46.193	19	Yes
	Recreation area - Include pool	78		78	11	4		3600	188			-22		-45.483	20	Yes
	Outdoor dining group (Rooftop)	75		75	11	4		3600	204					-46	38	Yes
	Waste collection	94	2	96	1			240	210			-22		-46.444	37	Yes
	Deliveries	85	2	87	1			60	183			-22		-45.249	29	Yes
	Total														38	**Yes**
	Criteria															60
2	Car door closure	75	2	77	200	100	50	2	49			-22		-33.804	30	Yes
	Car passby	69			200	100	50	15	49			-22		-33.804		Yes
	Car start	74	2	76	200	100	50	2	49			-22		-33.804	29	Yes
	Gym activities	80		80	11	4	9	3600	91			-24		-39.181	26	Yes
	Recreation area - Include pool	78		78	11	4		3600	73			-22		-37.266	28	Yes
	Outdoor dining group (Rooftop)	75		75	11	4		3600	95					-40	44	Yes
	Waste collection	94	2	96	1			240	91			-22		-39	44	Yes
	Deliveries	85	2	87	1			60	79			-22		-38	36	Yes
	Total														44	**Yes**
	Criteria															60
3	Car door closure	75	2	77	200	100	50	2	38			-22		-31.596	32	Yes
	Car passby	69			200	100	50	15	38			-22		-31.596		Yes
	Car start	74	2	76	200	100	50	2	38			-22		-31.596	31	Yes
	Gym activities	80		80	11	4	9	3600	61			-24		-35.707	29	Yes
	Recreation area - Include pool	78		78	11	4		3600	61			-22		-35.707	29	Yes
	Outdoor dining group (Rooftop)	75		75	11	4		3600	42					-32	52	Yes
	Waste collection	94			1			240	63			-22		-35.987		Yes
	Deliveries	85	2	87	1			60	75			-22		-37.501	36	Yes
	Total														52	**Yes**
	Criteria															60
4	Car door closure	75	2	77	200	100	50	2	39			-22		-32	32	Yes
	Car passby	69		69	200	100	50	15	39			-22		-32	24	Yes
	Car start	74	2	76	200	100	50	2	39			-22		-32	31	Yes
	Gym activities	80		80	11	4	9	3600	84			-24		-38.486	27	Yes
	Recreation area - Include pool	78		78	11	4		3600	63			-22		-35.987	29	Yes
	Outdoor dining group (Rooftop)	75		75	11	4		3600	91					-39.181	45	Yes
	Waste collection	94	2	96	1			240	78			-22		-37.842	45	Yes
	Deliveries	85	2	87	1			60	44			-22		-32.869	41	Yes
	Total														45	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance is predicted for all night-time onsite activities on the condition the recommendations in Section 9 are implemented.

7.2 Offsite Industrial Activities

Table 13 presents the measured noise levels from offsite industrial land uses with locations specified in Figure 3. It is noted that, during multiple site visits, all remaining industrial land uses were inaudible at the nearest site boundary.

Table 13: Offsite Industrial Noise Levels

Attended Noise Monitoring Location	Activity	Measured L_{Aeq} Noise Levels	Measured L_{AMAX} Noise Levels	Measurement Distance from Source (m)	Measured L_{Aeq} Corrected to 1m	Measured L_{AMAX} Corrected to 1m
C.P. Plating (eastern boundary)	Loading/unloading trucks with forklift	54.4	68.5	51	88.6	102.7
Vaxxas (eastern boundary)	Mechanical plant	55.1	64.1	79	93.1	102.1
Boral Concrete and Boral Asphalt (southern boundary)	Trucks entering and existing, conveyor belt, silo and car movements	66.9	81.3	29	96.1	110.5
Brisbane Cityworks (southern boundary)	Trucks entering and existing	66.8	86.7	10	86.8	106.7

Note measurements were attempted onsite but were highly affected by aircraft activities associated with Brisbane Airport, therefore the source measurements were used to predicted noise impacts.

7.2.1 Intrusive Noise, Acoustic Amenity & Night Time LAmax

The industrial noise source levels and predicted impacts at the nearest onsite unit are shown in Table 14 as follows. The maximum noise source levels were determined based on onsite attended measurements specified in Table 13.

Table 14: Noise Levels from Offsite Industrial Activities

	Source																								
Receiver	1. C.P. Plating 2. Vaxxas 3. Boral Concrete and Boral Asphalt 4. Brisbane Cityworks	Source @1m dB(A)	Correction dB(A)*	Corrected dB(A)	Number of events day	Number of events eve	Number of events night	Duration per event	Distance (m)	Barrier (height (m))	Barrier screening dB	Building TL or shield dB	Room Correction dB	Dist atten. @-6dB/dd	Source AbsLAmax-Leq dB	LAeqadj,T ext. dB(A) Day	LAeqadj,T ext. dB(A) Eve	LAeqadj,T ext. dB(A) Night	Absolute LAmax dBA	Intrusive Compliance LAeq			Amenity Compliance LAeq			LAMax Compliance
	Description									No										Day	Eve	Night	Day	Eve	Night	Night Max
	Criteria																			45	45	41	55	50	45	60
Nearest	C.P. Plating - Loading/unloading trucks with forklift	93		93	9	4	2	1800	234					-47.384	14	42	43	36	60	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unit	Vaxxas - Plant Noise	89		89	9	4	2	1800	125			-20		-41.938	9	23	24	17	36	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Boral - Truck & car movements, conveyor belt, silo	96		96	9	4	2	1800	386					-51.732	14	40	41	35	59	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Cityworks - Truck movements	87		87	9	4	2	1800	387					-51.754	20	31	32	26	55	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total															44	45	39	60	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS 1055:2018.

Compliance is predicted at the proposed units for all offsite industrial activities. This is on the condition the recommendations in Section 9 are implemented. It is noted that façade treatments required for aircraft noise are predicted to be sufficient for offsite activity noise associated with nearby industrial land uses if any potential exceedance occur within the proposed development.

No onsite activity (other than mechanical plant) was operational at 'Vaxxas' (refer to Figure 3 for location) during the site visits. As a result, maximum noise source levels were determined based on previous assessments of similar activities.

Table 15: Noise Levels from Offsite Industrial Activities (Vaxxas)

Source	1. Vaxxas Biomedical Facility Description	Source @1m dB(A)	Correction dB(A)*	Corrected dB(A)	Number of events day	Number of events eve	Number of events night	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building TL or shield dB	Room Correction dB	Dist atten. @-6dB/dd	LAeq adj,Text. dB(A) Day	LAeq adj, Text. dB(A) Eve	LAeq adj, Text. dB(A) Night	Absolute LAmax dBA	Intrusive Compliance LAeq Day	Eve	Night	Amenity Compliance LAeq Day	Eve	Night	LAMax Compliance Night Max
	Criteria																		45	45	41	55	50	45	60
1	Car door closure	75	2	77	200	100	50	2	59					-35.417	22	23	16	51	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby	69		69	200	100	50	15	59					-35.417	22	24	17	43	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	200	100	50	2	59					-35.417	21	22	15	50	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Truck manouevring	86		86	50	25	10	30	75					-37.501	34	36	28	57	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Truck reverse	92	2	94	50	25	10	30	75					-37.501	42	44	36	65	Yes	Yes	Yes	Yes	Yes	Yes	No
	Truck passby	82		82	50	25	10	30	75					-38	30	31	24	53	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Forklift loading/unloading	82		82	50	25	10	240	75					-37.501	39	41	33	53	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Forklift reverse	89	2	91	50	25	10	30	75					-37.501	39	41	33	62	Yes	Yes	Yes	Yes	Yes	Yes	No
	Deliveries	85	2	87	1			60	75					-37.501	21			58	Yes	n/a	n/a	Yes	Yes	Yes	Yes
	Waste collection (collection of industrial waste bin)	93		93	1			40	75					-37.501	26			64	Yes	n/a	n/a	Yes	Yes	Yes	No
	Total														46	47	40	65	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**No**

A maximum of 5dB(A) exceedance is predicted at units from offsite industrial activities associated with Vaxxas Biomedical Facility. It is noted that façade treatments required for aircraft noise are predicted to be sufficient for offsite activity noise associated with nearby industrial land uses if any potential exceedance occur for outdoor area of the proposed development. This is on the condition the recommendations in Section 9 are implemented which are predicted to provide a 25dB reduction from outside to inside complying with EPP 2019 Acoustic Quality Objectives for both living (criteria 35dB(A)) and sleeping (criteria of 30dB(A)) with the predicted internal noise level of 26dB for the day and evening and 15dB(A) for the night time period.

8. Aircraft Assessment

8.1 Attended Aircraft Noise Measurements

The noise levels for the various types of aircraft recorded at the measurement location are presented in Table 16.

Table 16: Measured Aircraft Noise Levels

Date	Time 24h	Aircraft	Direction	Action	dBA Lmax slow	dB Lmax (slow) Octave band centre frequency (Hz)						
						63	125	250	500	1k	2k	4k
10/07/24	14:24	Fokker 70	SW	Departing	69.6	75.8	59.9	67.3	64.2	62.6	54.0	41.3
10/07/24	14:39	Boeing 737-838	SW	Departing	59.8	55.5	56.6	52.0	51.7	52.0	43.4	35.6
10/07/24	14:40	Embraer E190AR	SW	Departing	68.4	61.4	60.2	65.6	62.2	56.6	51.2	47.2
10/07/24	14:45	Fokker 100	SW	Departing	66.8	64.3	63.0	69.3	62.2	57.5	46.5	42.0
10/07/24	14:50	Boeing 737-8SA	SW	Departing	61.2	61.7	61.9	57.1	53.0	52.6	46.7	44.9
10/07/24	14:54	E190AR	SW	Departing	68.8	65.3	60.9	69.0	65.3	57.1	53.3	43.9
10/07/24	14:56	Airbus A350-941	SW	Departing	66.1	65.3	60.4	67.6	59.4	54.8	54.2	43.7
18/07/24	9:28	Fokker 100	SW	Departing	69.6	66.4	70.6	71.0	69.8	65.6	55.3	45.3
18/07/24	9.31	Boeing 737-800	SW	Departing	73.3	72.7	75.2	76.3	73.3	67.2	60.5	47.1
18/07/24	9.35	Boeing 737-8FE	SW	Departing	63.5	70.2	68.8	64.2	64.8	55.7	45.1	37.7
18/07/24	9.38	Embraer E190AR	SW	Departing	74.5	68.3	73.2	74.9	75.3	68.9	60.7	45.0
18/07/24	9.40	Boeing 737-8FE	SW	Departing	70.7	72.0	67.2	72.5	71.4	64.4	51.6	34.8
18/07/24	9.44	Fokker 100	SW	Departing	71.3	69.2	72.5	72.4	70.4	66.9	57.8	46.7
18/07/24	9.47	Boeing 737 Max 8	SW	Departing	56.7	63.6	60.5	58.2	56.4	52.4	47.9	46.5
18/07/24	9.50	Boeing 737-838	SW	Departing	75.5	69.1	75.9	76.1	75.0	70.7	62.4	45.6
18/07/24	9.53	Boeing 737-8FE	SW	Departing	66.2	71.3	70.5	65.6	67.8	58.7	48.1	39.3
18/07/24	9.54	Embraer E190AR	SW	Departing	71.4	67.0	67.8	72.5	72.9	65.5	56.3	43.3
18/07/24	9.57	Airbus A330-202	SW	Departing	75.9	76.3	74.5	76.6	77.1	69.9	61.5	47.1
18/07/24	10.01	Embraer E190AR	SW	Departing	64.0	69.8	65.2	65.0	66.4	54.5	44.9	45.8
18/07/24	10.08	Boeing 737-8FE	SW	Departing	62.8	74.0	69.7	66.2	63	54.8	44.8	41.8
18/07/24	10.09	Boeing 737-8FE	SW	Departing	75.4	72.9	71.1	76.5	76.6	69.3	62.4	43.6
18/07/24	10.10	Airbus A330-232	SW	Departing	71.7	68.6	67.5	73.1	70.9	68.2	57.3	45.4
Maximum level in each octave band and corresponding total dBA					75.9	74.0	75.9	76.6	77.1	70.7	62.4	47.2

The maximum measured aircraft noise level was found to be 75.9 dBA and therefore used for the purposes of a conservative assessment.

Based on maximum aircraft noise levels, additional façade treatments are required. Refer to Section 9 for recommendations.

9. Recommendations

9.1 Unit Façade Construction

All building treatments for aircraft noise calculated using Australian Standard 2021:2015 "Indoor Design Sound Levels for Determination of Aircraft Noise Reduction".

9.1.1 Unit Glazing

The minimum glazing treatments are presented in Table 17, with the installed glazing system to comply with the following:

- The minimum glass thickness specified shall not be reduced regardless of the R_w performance of the glazing system.
- If compliance cannot be achieved with the minimum R_w ratings, the glazing system shall be upgraded until compliance is achieved.
- Glazing specified with acoustic seals requires a Q-lon seal or an equivalent product, mohair seals are not acceptable.
- The glazier shall provide NATA test reports on request to verify compliance with the minimum R_w ratings. Generic reports are not acceptable.

Table 17: Glazing Treatments for Aircraft Noise Impacts

Location		Rw Rating	Façade Glazing	Acoustic Seals
Unit	Room			
All Units	All Living Kitchen Dining Rooms	31	6.38mm laminated	yes
	All Bedrooms	34	10.38mm laminated	yes

Any locations not identified in the Table 17 shall require 4mm float for windows (minimum Rw 22) and 5mm toughened for sliding doors (minimum Rw 23).

9.1.2 Unit Wall Construction

All masonry and blockwork wall systems will comply with the minimum R_W of 45. For lightweight wall systems, we recommend the following:

- 1 layer of 9mm FC, 92mm steel stud with 75mm glasswool batts (density 11kg/m^3) and 1 layers of 13mm fire rated plasterboard.

9.1.3 Unit Roof Construction

For the roof systems, we recommend construction as follows:

- R_W 50 – The proposed concrete slab on the rooftops is predicted to achieve an R_W50.

9.2 Gym Façade Construction

9.2.1 Gym Glazing

The minimum glazing treatments presented in Table 18 are required to comply with the following:

- The minimum glass thickness specified shall not be reduced regardless of the R_w performance of the glass unless the glazier can provider a specific (non-generic) NATA Test report proving the proposed glazing system complies (the test report must be based on the same configuration proposed for the development). Note an estimation or calculated performance will not be accepted.
- If compliance cannot be achieved with the minimum R_w ratings, the glazing system shall be upgraded until compliance is achieved.
- Glazing specified with acoustic seals requires a seal that has been tested with a glazing system or door to achieve an Rw rating in accordance with AS/NZS ISO 717.1, mohair seals are not acceptable.
- The glazier shall provide NATA test reports on request to verify compliance with the minimum R_w ratings. Generic reports are not acceptable.

Table 18: Gym Glazing Treatments

Location	R_W Ratings			Glazing Thickness	Acoustic Seals
	Wall	Roof	Glazing		
Gym	35	35	31	6.38mm	Yes

9.2.2 Gym Wall Construction

The wall construction recommendations are included in Table 19 below. Note that these are not the only allowable methods of construction for the development, and alternative constructions to achieve the required R_W ratings may also be provided.

Table 19: Gym Wall Construction

Wall Rw	Minimum Wall Treatments
35	Masonry veneer wall at least 110mm thick, 90mm timber studs at 600mm centres, 20mm gap, 10mm plasterboard internal. OR 6mm fibre cement sheeting or sheet metal external, 90mm timber studs at 600m centres, 75mm glasswool insulation (11kg/m^3) or equivalent, 13mm plasterboard internal.

9.2.3 Gym Roof/Ceiling Construction

The roof/ceiling construction recommendations are included in Table 20 below. Note that these are not the only allowable methods of construction for the development, and alternative constructions to achieve the required Rw ratings may also be provided.

Table 20: Gym Roof Construction

Roof Rw	Minimum Roof Treatments
35	Sheet metal roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.

9.2.4 Gym Entry Doors

Table 21: Gym Entry Door Construction

Door Rw	Minimum Communal Facilities/Gym Entry Door Construction
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/m^2; or (iv) solid core timber door not less than 35mm thick fitted with full perimeter acoustically rated seals.

9.3 Mechanical Ventilation

To achieve the required internal noise levels for the development, all locations nominated in Table 17 and Table 18 will require an alternative ventilation system similar to air-conditioning or mechanical ventilation that complies with the fresh air requirements of AS1668 and the NCC.

9.4 Onsite Activities

Based on the predicted noise levels and subjective assessment of the site and surrounds, noise impacts at the receiver locations are predicted to comply with the assessment criteria on the condition the following management plans are implemented:

- Use of the pool area and rooftop terrace shall be limited to the day and evening periods, between 7am and 10pm.
- All gym doors and windows are to be closed during operation.
- Deliveries and waste collection shall be limited to the daytime period, between 7am and 6pm.
- Carpark and ramp finished surfaces should consist of materials which provide low tyre squeal characteristics. Any traversable drainage grates must be securely fastened.

9.4.1 Onsite Mechanical Plant

No information regarding mechanical services was available at the time of the assessment. We recommend that any new mechanical plant is designed to comply with the criteria stated in Section 6.2.2 with an assessment by qualified acoustic consultant to be conducted prior to installation.

9.5 Offsite Activities

With the exception of the Vaxxas Biomedical Facility, noise impacts at the nearest onsite receiver locations are predicted to comply with the assessment criteria. A maximum of 5dB(A) exceedance is predicted units for offsite industrial activities associated with Vaxxas Biomedical Facility. It is noted that façade treatments required for aircraft noise are predicted to be sufficient for offsite activity noise associated with nearby industrial land uses if any potential exceedance occur within the proposed development. This is on the condition the recommendations in Section 9 are implemented.

10. Conclusion

An aircraft and environmental noise assessment was conducted for the proposed residential development to be located at Site 18B, 260 Macarthur Avenue, Hamilton. The development is predicted to satisfy all the relevant noise assessment requirements on the condition that the recommendations in Section 10 are implemented.

If you should have any queries, please do not hesitate to contact us.

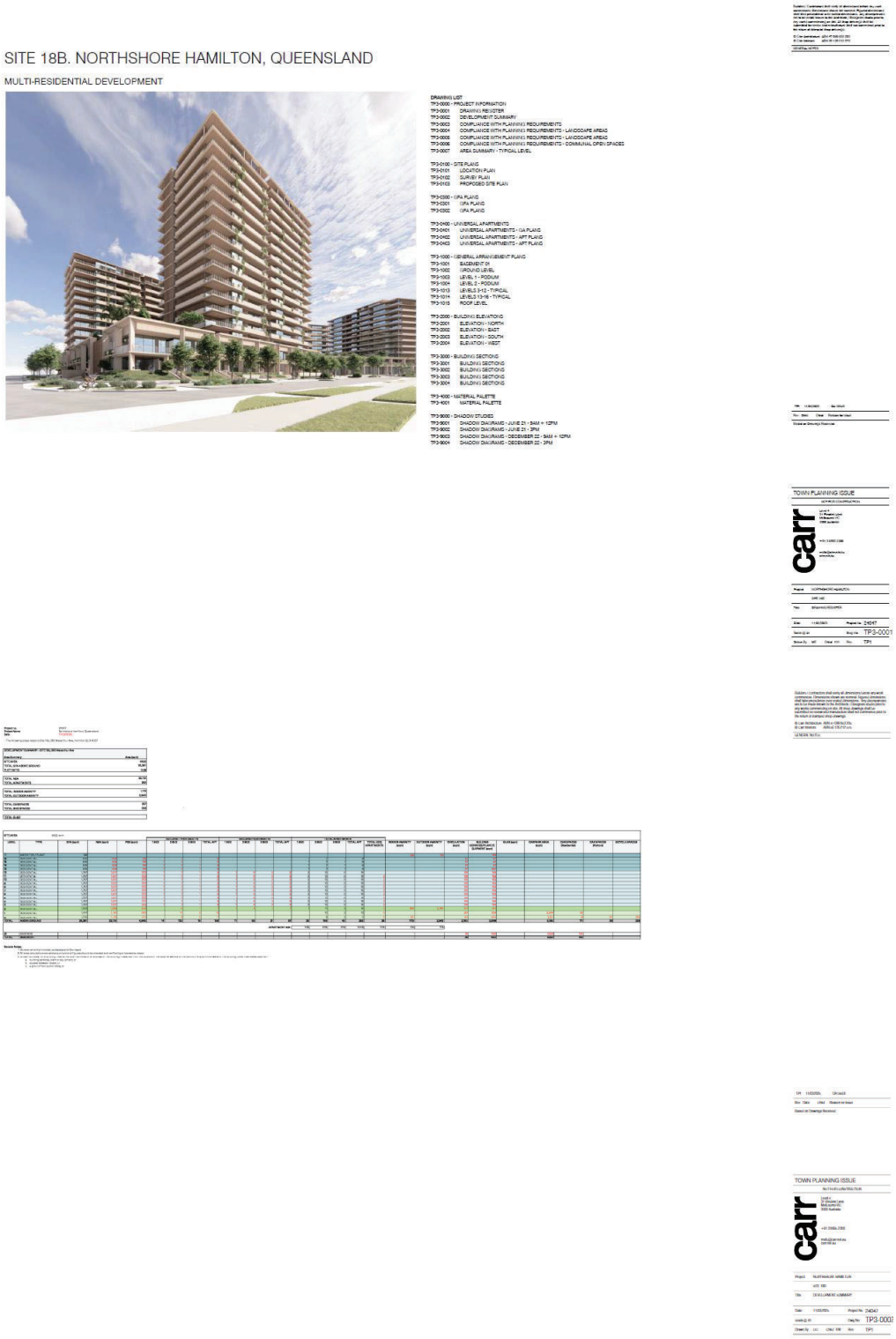
Report Prepared By

David Dadd (B.Sc. (Env.) MAAS)
Senior Acoustic Consultant

acousticworks)))

11. Appendices

11.1 Development Plans



SITE 18B. NORTHSHORE HAMILTON, QUEENSLAND

MULTI-RESIDENTIAL DEVELOPMENT

DRAWING LIST

TP3-0000 - PROJECT INFORMATION
TP3-0001 DRAWING REGISTER
TP3-0002 DEVELOPMENT SUMMARY
TP3-0003 COMPLIANCE WITH PLANNING REQUIREMENTS
TP3-0004 COMPLIANCE WITH PLANNING REQUIREMENTS - LANDSCAPE AREAS
TP3-0005 COMPLIANCE WITH PLANNING REQUIREMENTS - LANDSCAPE AREAS
TP3-0006 COMPLIANCE WITH PLANNING REQUIREMENTS - COMMUNAL OPEN SPACES
TP3-0007 AREA SUMMARY - TYPICAL LEVEL

TP3-0100 - SITE PLANS
TP3-0101 LOCATION PLAN
TP3-0102 SURVEY PLAN
TP3-0103 PROPOSED SITE PLAN

TP3-0300 - GFA PLANS
TP3-0301 GFA PLANS
TP3-0302 GFA PLANS

TP3-0400 - UNIVERSAL APARTMENTS
TP3-0401 UNIVERSAL APARTMENTS - GA PLANS
TP3-0402 UNIVERSAL APARTMENTS - APT PLANS
TP3-0403 UNIVERSAL APARTMENTS - APT PLANS

TP3-1000 - GENERAL ARRANGEMENT PLANS
TP3-1001 BASEMENT 01
TP3-1002 GROUND LEVEL
TP3-1003 LEVEL 1 - PODIUM
TP3-1004 LEVEL 2 - PODIUM
TP3-1013 LEVELS 3-12 - TYPICAL
TP3-1014 LEVELS 13-16 - TYPICAL
TP3-1015 ROOF LEVEL

TP3-2000 - BUILDING ELEVATIONS
TP3-2001 ELEVATION - NORTH
TP3-2002 ELEVATION - EAST
TP3-2003 ELEVATION - SOUTH
TP3-2004 ELEVATION - WEST

TP3-3000 - BUILDING SECTIONS
TP3-3001 BUILDING SECTIONS
TP3-3002 BUILDING SECTIONS
TP3-3003 BUILDING SECTIONS
TP3-3004 BUILDING SECTIONS

TP3-4000 - MATERIAL PALETTE
TP3-4001 MATERIAL PALETTE

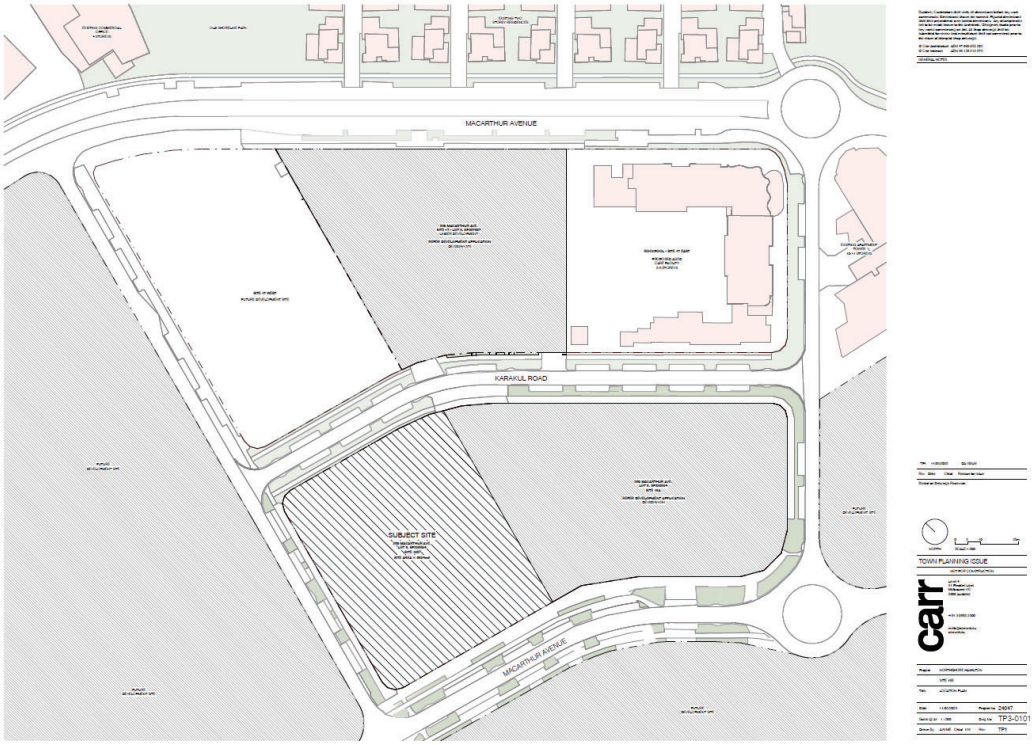
TP3-9000 - SHADOW STUDIES
TP3-9001 SHADOW DIAGRAMS - JUNE 21 - 9AM + 12PM
TP3-9002 SHADOW DIAGRAMS - JUNE 21 - 3PM
TP3-9003 SHADOW DIAGRAMS - DECEMBER 22 - 9AM + 12PM
TP3-9004 SHADOW DIAGRAMS - DECEMBER 22 - 3PM

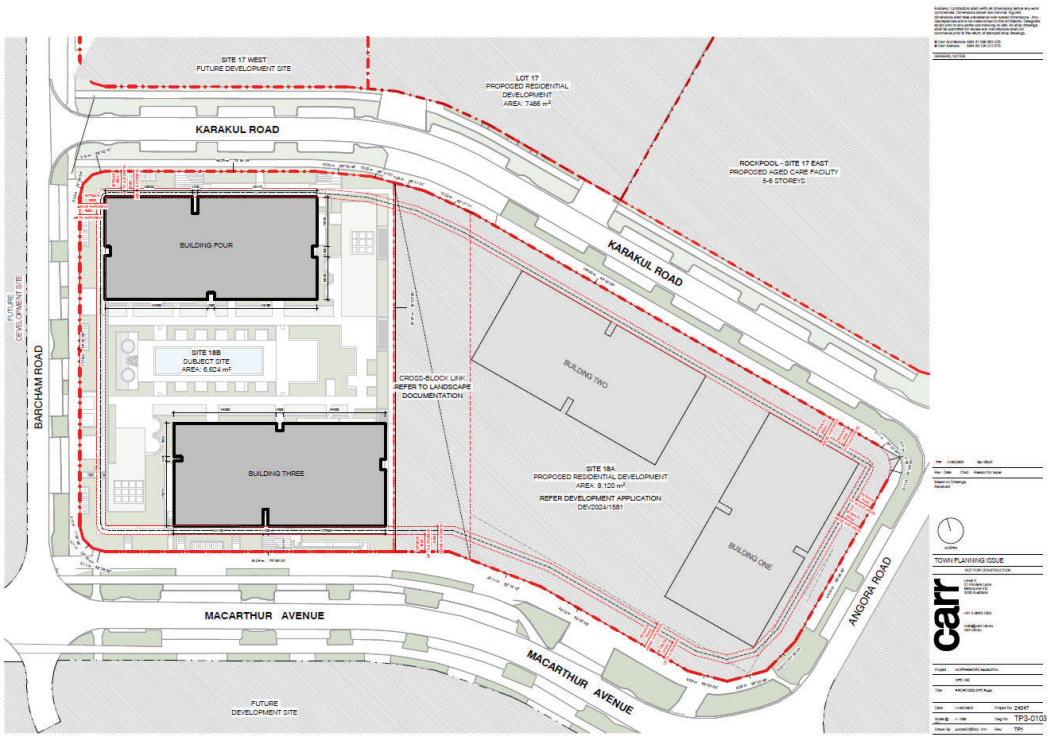
TOWN PLANNING ISSUE

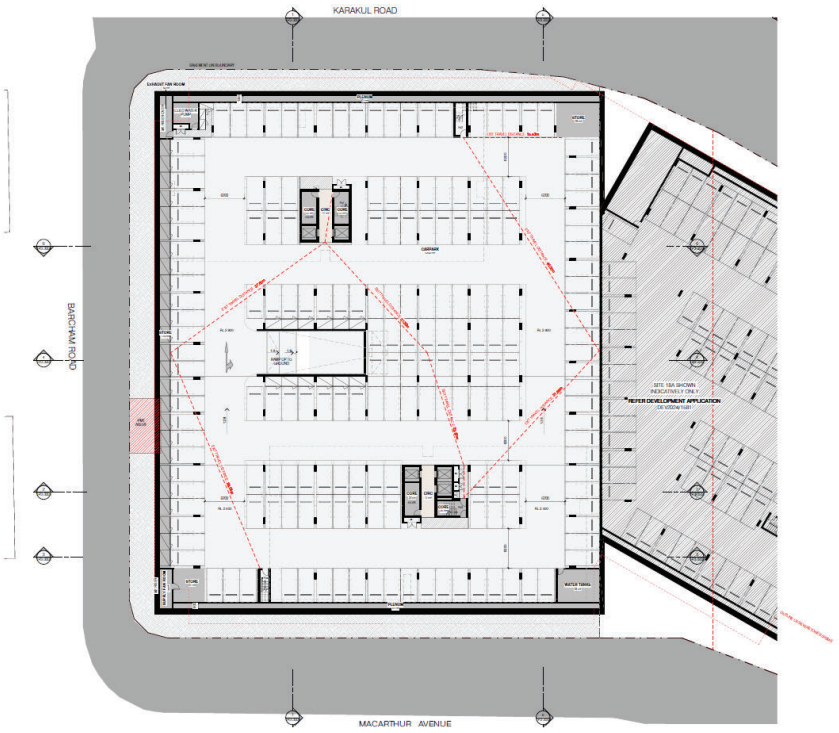
carr

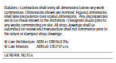
TOWN PLANNING ISSUE

carr

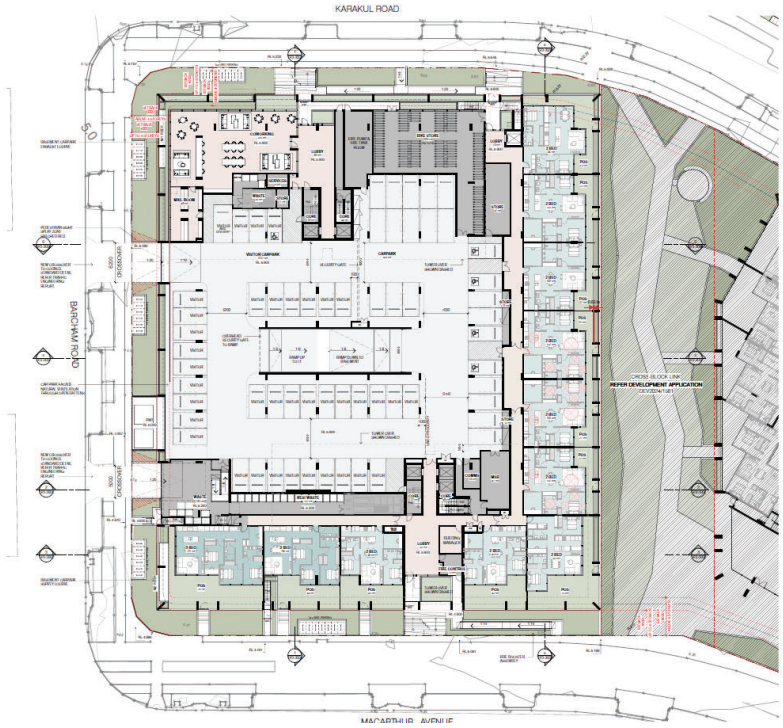

MACARTHUR AVENUE
KARAKUL ROAD
SUBJECT SITE
MACARTHUR AVENUE
TOWN PLANNING ISSUE
carr

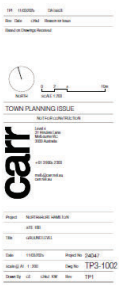

SITE 17 WEST
FUTURE DEVELOPMENT SITE
LOT 17
PROPOSED RESIDENTIAL
DEVELOPMENT
AREA: 7466 m²
KARAKUL ROAD
ROCKPOOL - SITE 17 EAST
PROPOSED AGED CARE FACILITY
5-6 STOREYS
KARAKUL ROAD
BUILDING FOUR
SITE 18B
SUBJECT SITE
AREA: 6,624 m²
BUILDING THREE
CROSS-BLOCK LINK
REFER TO LANDSCAPE
DOCUMENTATION
BUILDING TWO
SITE 18A
PROPOSED RESIDENTIAL DEVELOPMENT
AREA: 8,120 m²
REFER DEVELOPMENT APPLICATION
DEV2024/1581
BUILDING ONE
BARCHAM ROAD
FUTURE
DEVELOPMENT SITE
MACARTHUR AVENUE
MACARTHUR AVENUE
ANGORA ROAD
FUTURE
DEVELOPMENT SITE
TOWN PLANNING ISSUE
carr

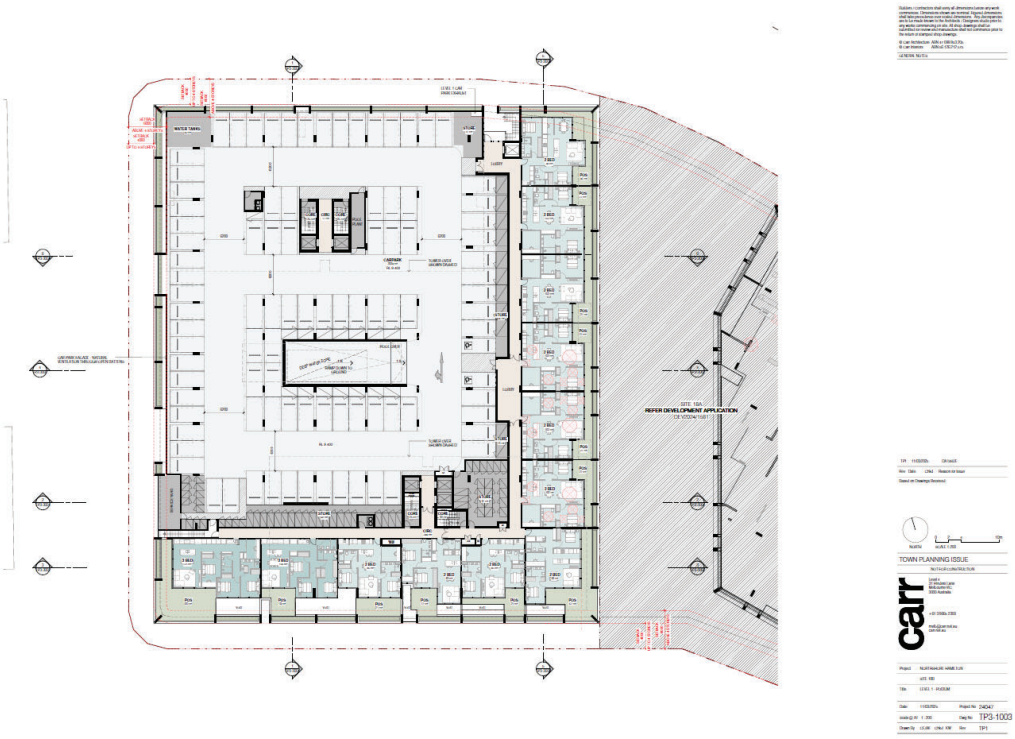

KARAKUL ROAD
BARCHAM ROAD
MACARTHUR AVENUE
SITE TBA SHOWN INDICATIVELY ONLY
REFER DEVELOPMENT APPLICATION

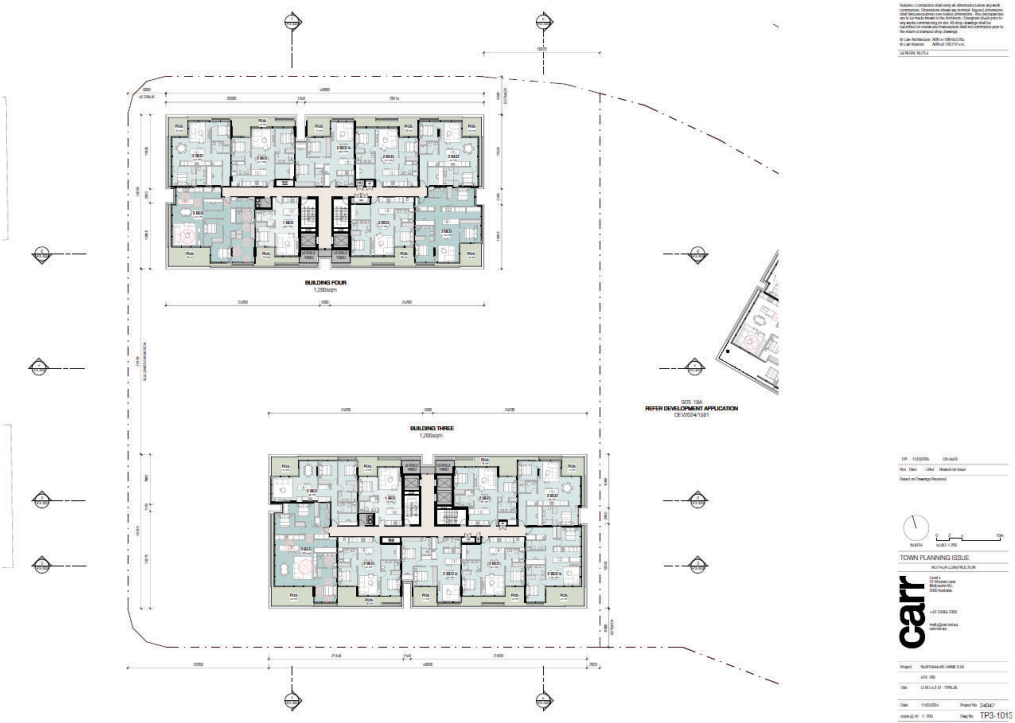


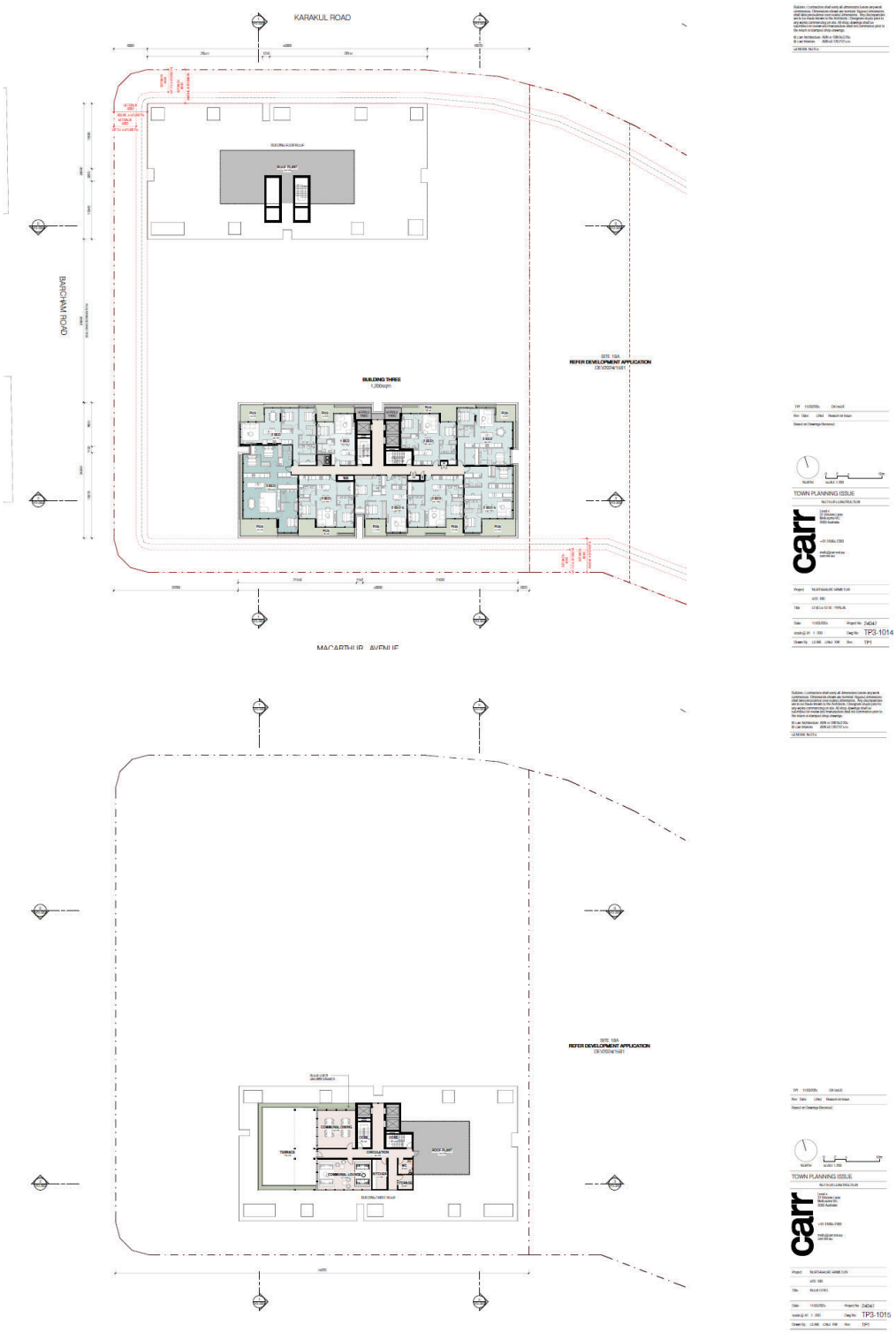

TOWN PLANNING ISSUE
carr
TP3-1001

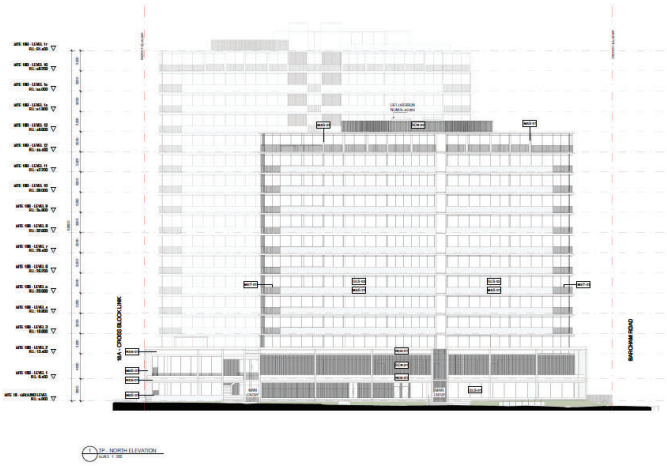

KARAKUL ROAD
BARCHAM ROAD
REFER DEVELOPMENT APPLICATION

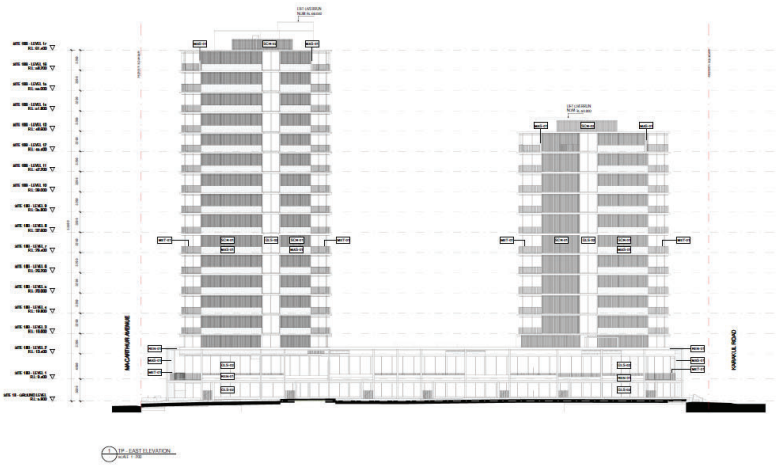

TOWN PLANNING ISSUE
carr
TP3-1002

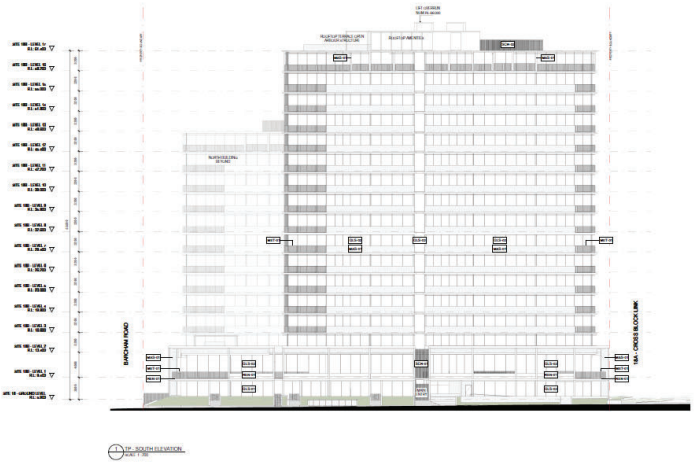

REFER DEVELOPMENT APPLICATION


BUILDING FOUR
BUILDING THREE
REFER DEVELOPMENT APPLICATION

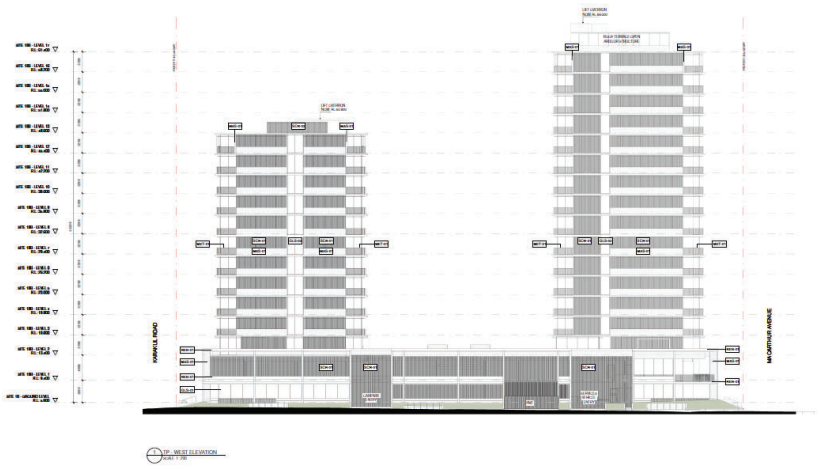

KARAKUL ROAD
BARCHAM ROAD
BUILDING THREE
REFER DEVELOPMENT APPLICATION
TOWN PLANNING ISSUE
carr
TP3-1014
TP3-1015





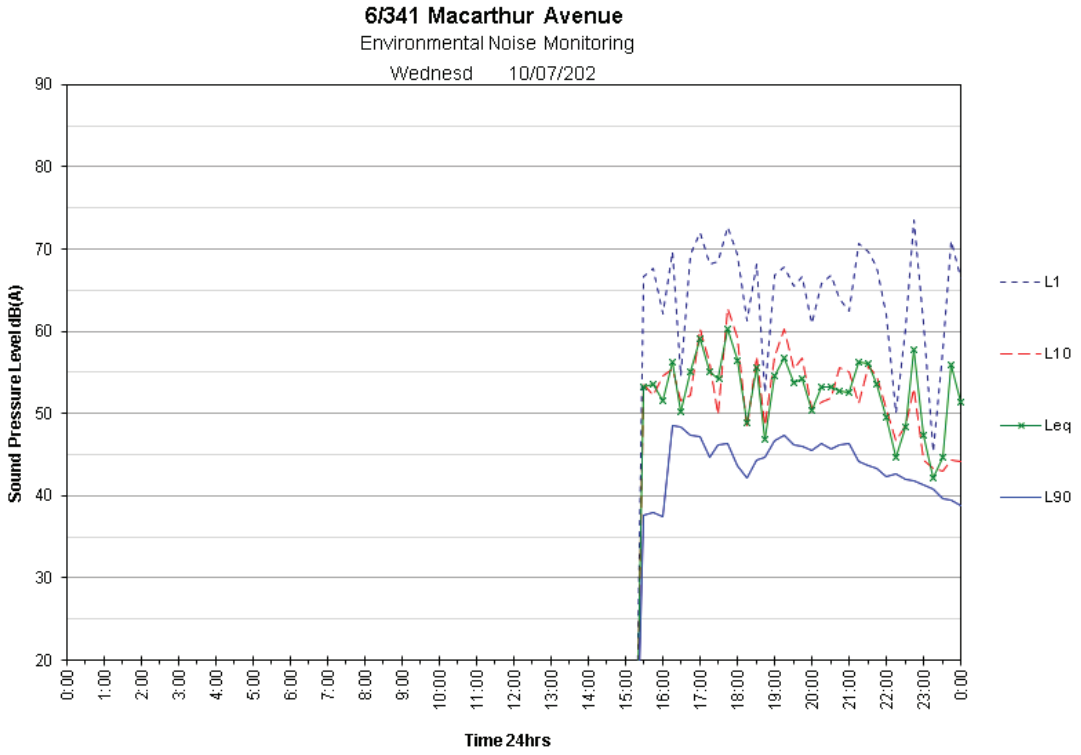

BYRON ROAD
MACARTHUR AVENUE

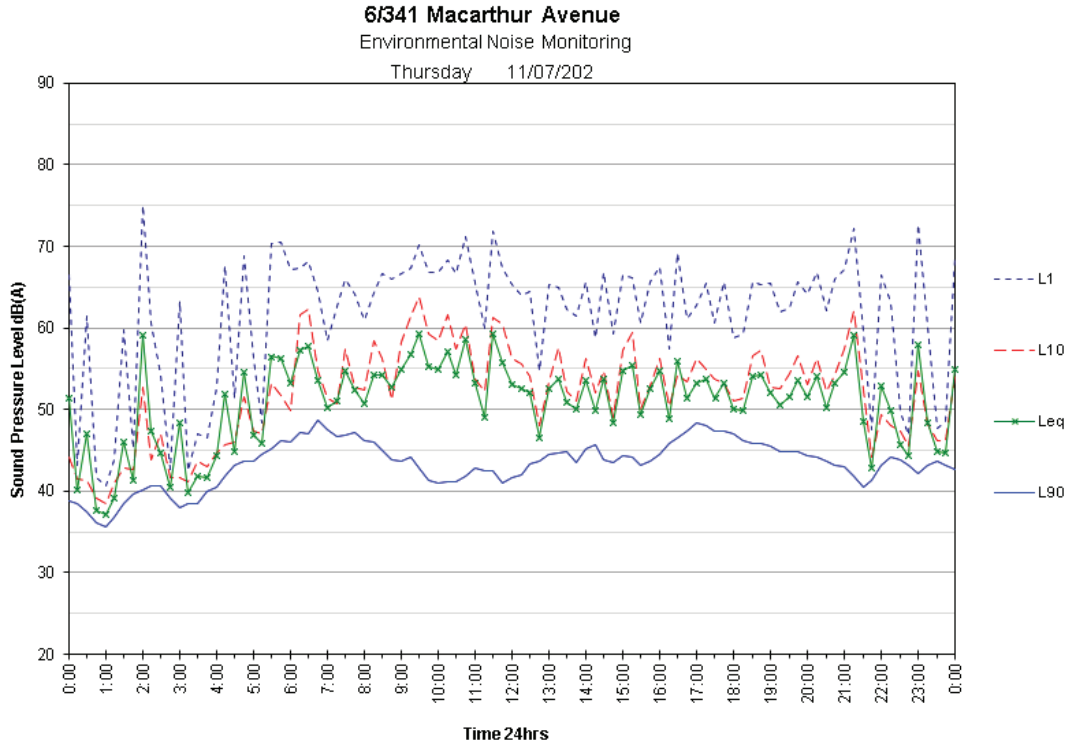

TOWN PLANNING ISSUE
carr
TP3-2003

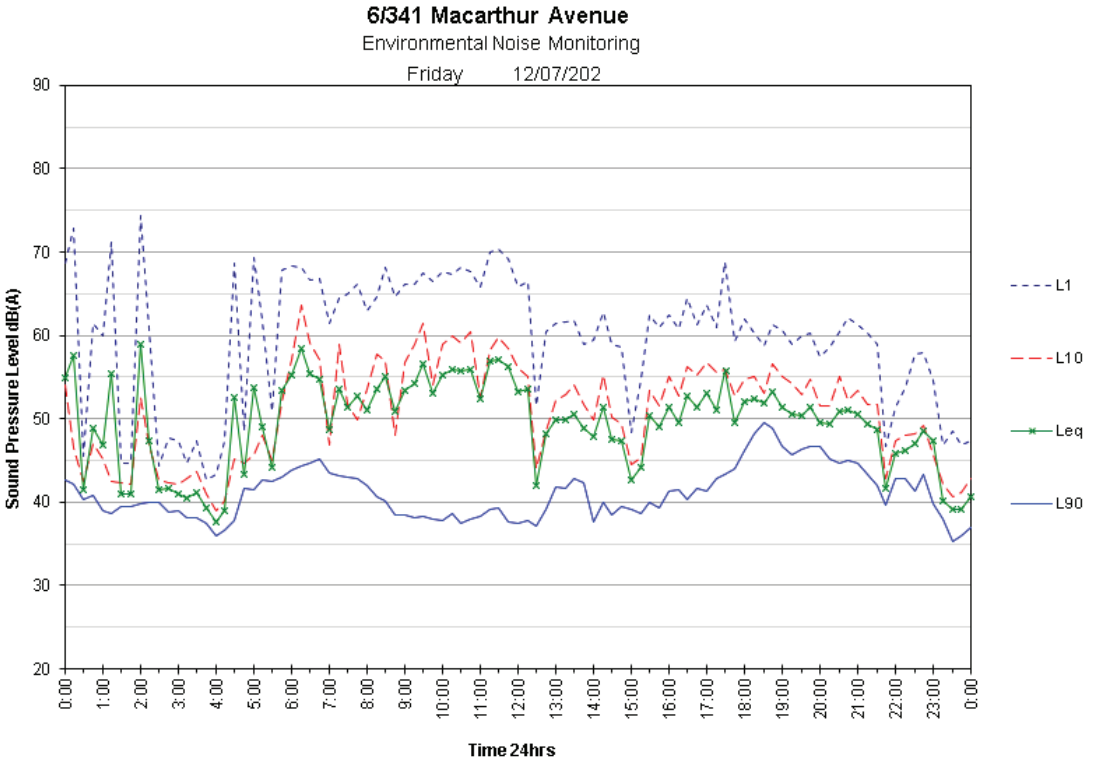

KIRKDALE ROAD
MACARTHUR AVENUE

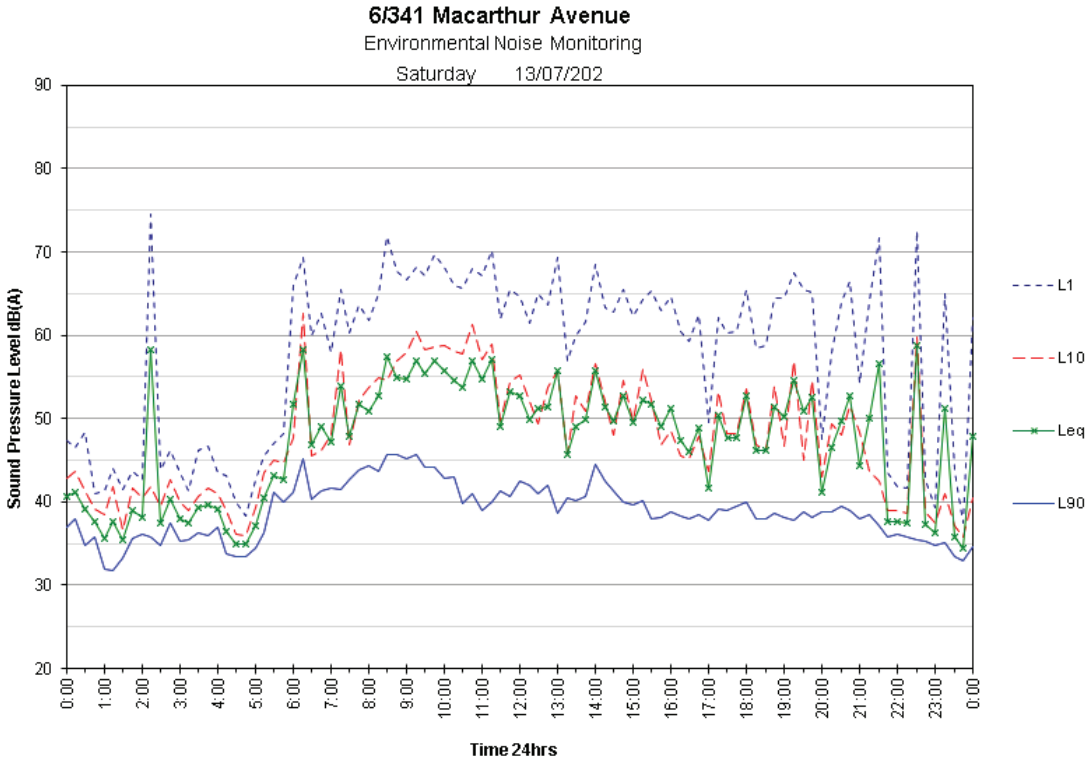

TOWN PLANNING ISSUE
carr
TP3-2004

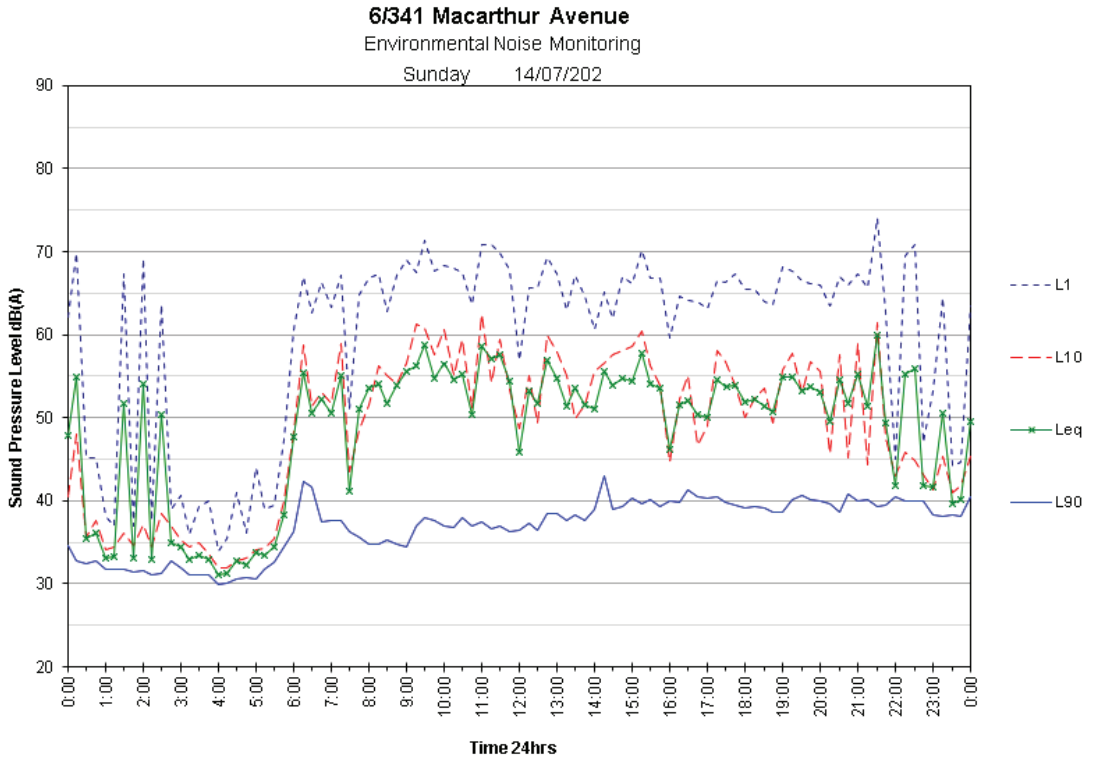
11.2 Noise Monitoring Charts

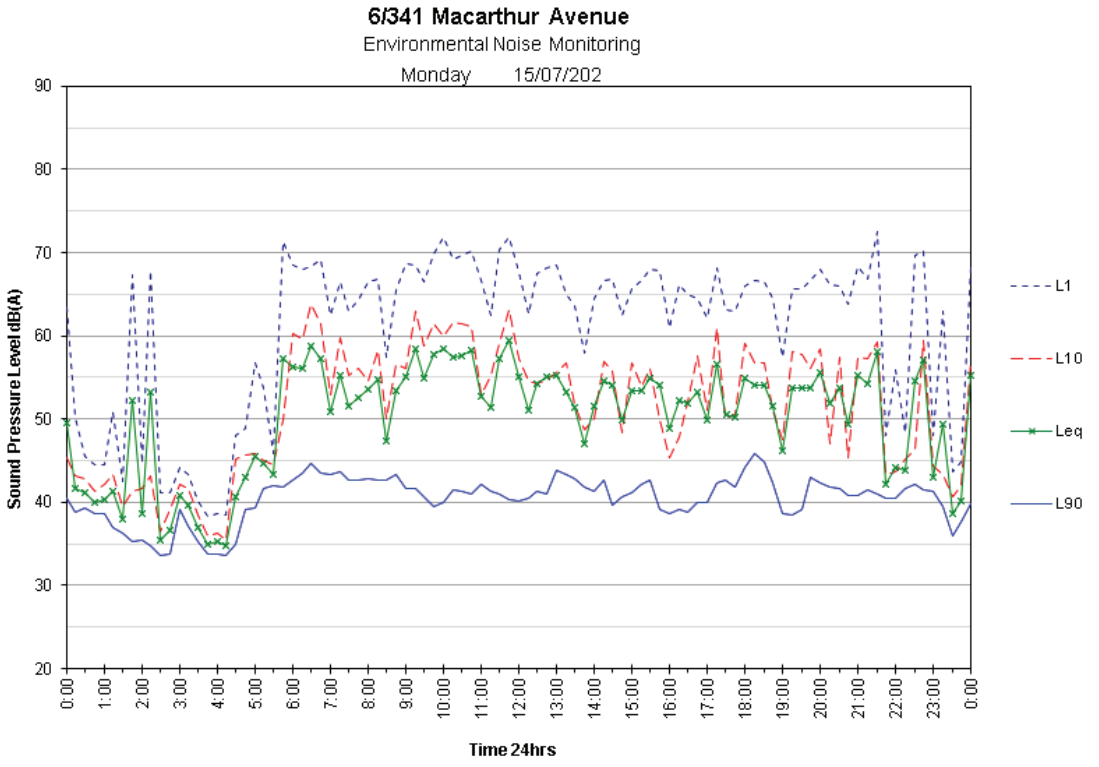


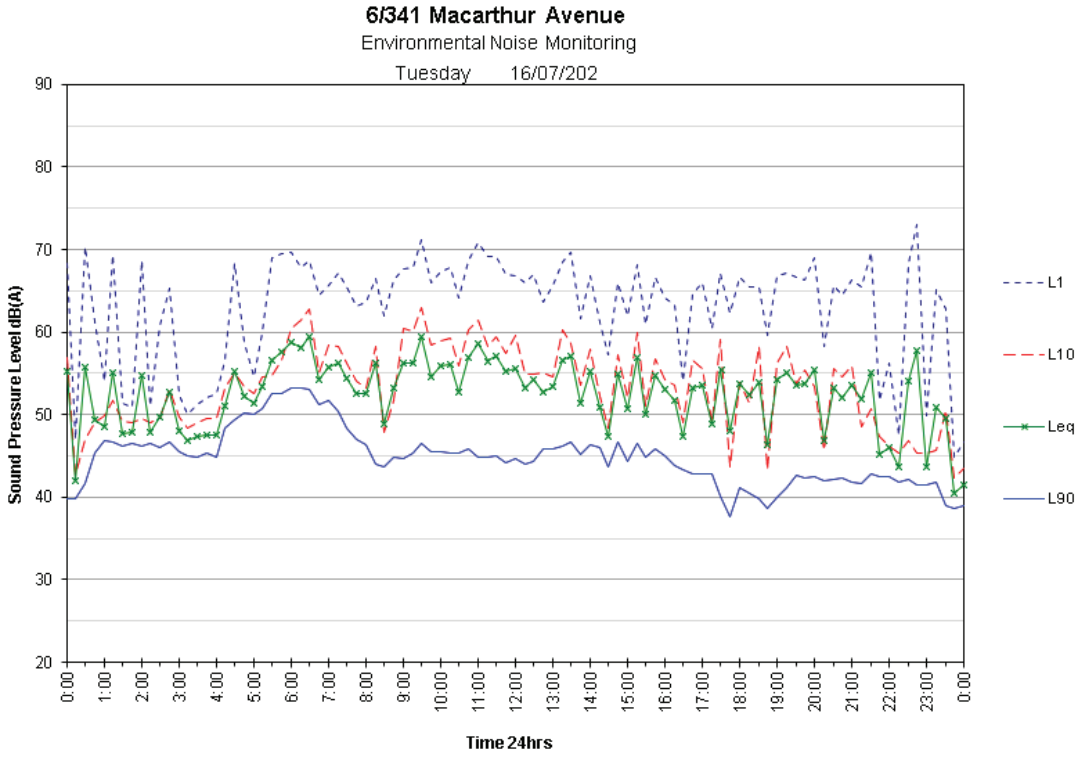


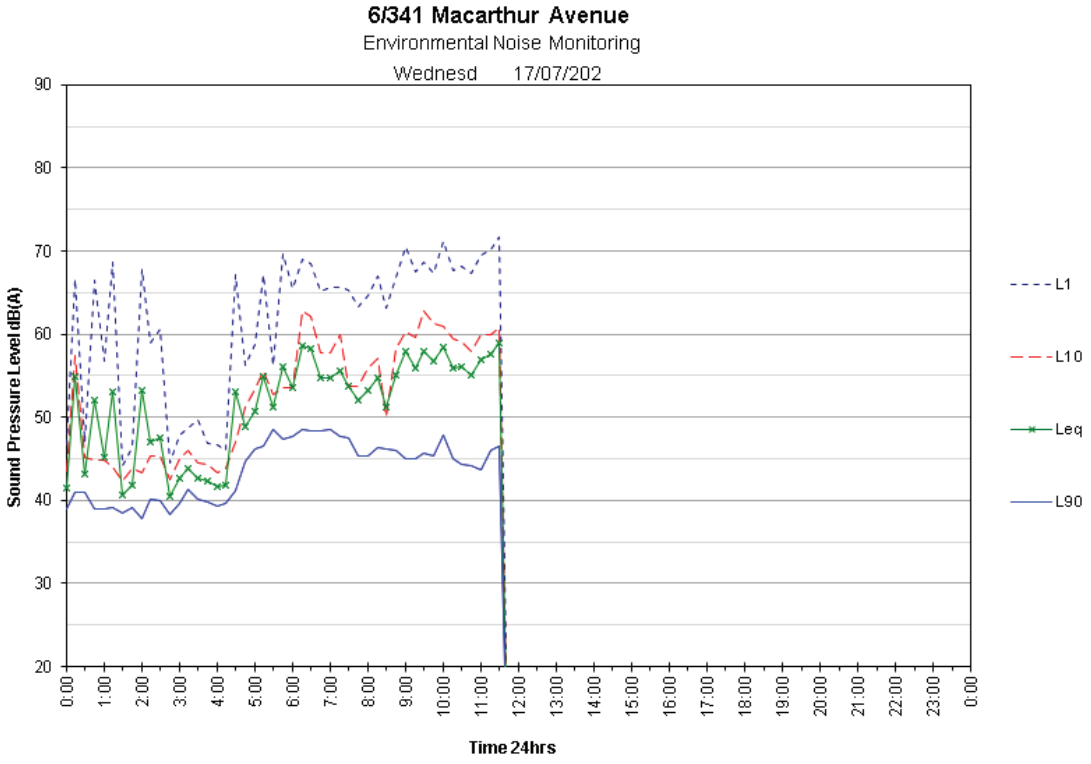

6/341 Macarthur Avenue
Environmental Noise Monitoring
Friday 12/07/202
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


6/341 Macarthur Avenue
Environmental Noise Monitoring
Saturday 13/07/202
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


6/341 Macarthur Avenue
Environmental Noise Monitoring
Sunday 14/07/202
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


6/341 Macarthur Avenue
Environmental Noise Monitoring
Monday 15/07/202
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


6/341 Macarthur Avenue
Environmental Noise Monitoring
Tuesday 16/07/202
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90


6/341 Macarthur Avenue
Environmental Noise Monitoring
Wednesd 17/07/202
Sound Pressure Level dB(A)
Time 24hrs
L1
L10
Leq
L90