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Proposed Relocatable Home Park Expansion
530 Bridge Street, Wilsonton
(Lot 3 on RP118443)

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

Prepared For:

Hometown Australia Communities

26 October 2023

crgref: 22143 report REV 5

1.0 INTRODUCTION

This report is in response to a request by Hometown Australia Communities for a revised environmental noise assessment of a proposed relocatable home park expansion along Bridge Street in Wilsonton.

In undertaking the assessment, unattended and attended noise monitoring was undertaken, and through modelling, noise predictions of existing and future road noise from Bridge Street, aircraft noise from the Toowoomba City Aerodrome, and offsite commercial / industrial operational noise surrounding the site to the south and east were produced. Based upon the predicted noise impact levels, recommendations regarding acoustic treatment to the development have been provided.

This report is a revision to a previous assessment (CRGref: 22143 report REV 3 dated June 2023) and is required due to changed dwelling plans, and to respond Item 2 of Toowoomba Regional Council's Information Request dated 7th August 2023 as presented below:

2. ACOUSTIC FENCE

	Issue:
2.1	The applicant submitted an Environmental Noise Impact Assessment, Rev. 32, prepared by CRG Acoustics and dated 23/06/2023 that provided recommendations to mitigate the potential of each noise source to create a nuisance at the proposed residential dwellings. Council officers accept the methodology that has been utilised to model the potential impacts of each noise source. The mitigation measures proposed will achieve compliance with the Acoustic Quality Objectives the requirements of State Code 4.4 (for an acoustic fence) and Australian Standard AS2021 "Acoustics – Aircraft Noise Intrusion – Building Siting and Construction" (for building shelf treatments). The Environmental Noise Impact Assessment includes a requirement for an acoustic barrier fence to be located to the north of the site along Bridge Street and extending 20m south into the drainage channel as shown within Sketch 1. Two design options were shown within Section 6.1. Both options require construction inside the flow path of the drainage line. This is considered to interfere with flow rates and velocities within the creek that need to be included within the Stormwater Management Report and the Flood Hazard Report that were submitted with the application. Council officers consider that an alternate location is required for this acoustic barrier fence that avoids the flow path.
	Information Required:
	The applicant is required to provide an amended Environmental Noise Impact Assessment that recommends an acoustic fence alignment which avoids the flow path. The report should also include amendments to the relevant sections to demonstrate compliance with the Acoustic Quality Objectives and the requirements of State Code 4.4. The amended Environmental Noise Impact Assessment must include the following: a) Model runs of road traffic noise within the northeast corner of the site; b) Results tables; c) Acoustic fence locations in Sketch 1; and d) Any Additional building treatments (if required).

In relation to the above, the alignment of the barrier has been redesigned to run directly adjacent the proposed eastern boundary of Lot 270 to avoid the adjacent water flow path. This report includes the revised noise modelling contours and results tables detailed in Section 5.1.4, updated recommended acoustic barrier Sketch 1 presented in Section 6.1.1, and updated building shell treatments associated with the updated dwelling designs detailed in Section 6.2.

In relation to the updated dwelling types, in the context of Item 7 of the Information Request, the applicant has resolved to only include two dwelling types: a two-bedroom option and a three-bedroom option. The acoustic assessment has been updated to address these two dwelling types.

2.0 SITE & DEVELOPMENT DESCRIPTION

The subject site is described as Lot 3 on RP118443, 530 Bridge Street, Wilsonton, and is zoned *"Low Density Residential"*. The site is bounded by Bridge Street to the north, the existing Bridge Street Resort to the west, and commercial / industrial operations to the south and east (Zoned Low and Medium Impact Industry). For site location refer to Figure 1 in Appendix A.

The proposal is to construct a relocatable home park with 60 dwelling sites, which is an extension to the existing Bridge Street Resort. The 60 dwelling sites will be constructed over three stages. For development plans refer to Appendix B.

As the proposal is constructing a noise sensitive development in close proximity to Bridge Street, the development is required to be assessed under the State Development Assessment Provisions (SDAP) Queensland State Code 1: *"Development in a State-controlled Road Environment"* Version 3.0 (effective 18th February 2022).

The site is located approximately 500m to the northwest of the Toowoomba City Aerodrome main runway, and based Toowoomba City Council's mapping, is within the ANEF 20 - 25 contour – refer to Attachment B in Appendix A. The development has been assessed in accordance with the *"Airport Environs Overlay Code"*, and Australian Standard AS 2021 *"Acoustics – Aircraft noise intrusion – Building siting and construction"*.

Offsite adjacent commercial / industrial activity impacting proposed residential dwellings has been assessed in accordance Performance Outcome PO10 and PO12 of the *"Environmental Standards Code"*. Offsite operations include Boral Asphalt to the southwest along Orford Court; Airglide Towbars and Weston Kitchens and Bathrooms to the south along Orford Court; Allen Hydrepair (Hydrostatic Transmissions – distributer an repair) and Boucher & Co (one-off furniture manufacturer) to the east along Orford Court; and Petz Tucker and Queensland Choice Meats / Darling Fresh Smoke Haus to the east along Freighter Ave.

From a recent site visit to the subject site, the majority of offsite commercial / industrial activities (creating the highest noise emissions) include car and truck movements (including semi-trailers / articulated trucks), forklift movements / loading / unloading, and a front-end loader at Boral Asphalt. Site noise measurements were also undertaken which recorded a mechanical cyclone, nut runner, and dropping timber, along the southern site boundary (refer to Section 3.4). The offsite commercial / industrial uses generally operate during the daytime hours only; however, given that retirees typically nap during the daytime period in addition to their night-time sleep, we have assessed the onsite dwellings at both living areas and bedrooms. By designing for acceptable noise levels inside bedrooms (night-time criterion) and living rooms (daytime and evening criterion), we also ensure that the future commercial / industrial use proximate to the subject site would not be compromised. Further to this, the *"Low Impact Industry Zone Code"* cites that uses adjacent Low Density Residential Zones (as per the subject site) do not generate audible noise between the hours of 7pm and 6am; thus, limiting uses to the daytime period (unless acoustically treated).

3.0 AMBIENT NOISE SURVEY

3.1 Instrumentation

The following equipment was used to record ambient noise levels at the subject site.

- Rion NC 73 Calibrator; and
- BSWA Environmental Noise Logger.

All instrumentation used in this assessment held current calibration certificate from a certified NATA calibration laboratory at the time of the surveys.

3.2 Unattended Noise Measurement Methodology

A logger was located towards the northern end of the site fronting Bridge Street. The logger was in a free-field location with the microphone approximately 1.4m above ground and 18m from the nearest lane of Bridge Street. Refer to Appendix A for the logger location.

One logger was set to record noise statistics in one-hour blocks continually between Monday 10/10/2022 and Monday 17/10/2022.

Road traffic noise levels were conducted generally in accordance with Australian Standard AS2702 - 1984 *"Acoustics - Methods for the measurement of road traffic noise"*. The operation of the sound level logging equipment was field calibrated before and after the measurement session with no significant drift from the reference signal recorded.

Daily weather observations were obtained from the Bureau of Meteorology's Toowoomba weather station. Weather conditions during the noise monitoring period were fine, a temperature range between 8 and 23ºC, and a relative humidity between 40 and 88%.

3.3 Unattended Noise Measurement Results

Table 1 below presents the measured ambient noise levels from the logger location. Graphical presentation of the measured noise levels from the logger are presented in the Appendix C.

Traffic Noise	Time Period	Measured Levels dB(A)		
		12/10/2022	12/10/2022	Average
$L_{10\ 18hr}$	6am to Midnight	59	60	59
$L_{10\ 12hr}$	6am to 6pm	60	62	61
$L_{eq\ 1hr}$ Daytime	6am to Midnight	60	63	61
$L_{eq\ 1hr}$ Night time	Midnight to 6am	57	57	57
$L_{90\ 18hr}$	6am to Midnight	48	49	49
$L_{90\ 8hr}$	10pm to 6am	40	40	40

Table 1: Measured ambient noise levels at the logger location.

3.4 Existing Offsite Commercial / Industrial Activities Measurement Results

Attended measurements were conducted of existing offsite commercial / industrial operations on Monday 10/10/2022. Testing was undertaken at the southern end of the subject site with a BSWA sound level meter.

The microphone was in a free-field location, approximately 1.5m above ground and directed towards the sound source/s.

All measurements were conducted generally in accordance with Australian Standard AS 1055 *"Acoustics-Description and measurement of environmental noise"*. The operation of the sound level equipment was field calibrated before and after each measurement session with no significant drift from the reference signal recorded.

Weather conditions during the monitoring period were fine, with a temperature of approximately 25°C. Wind speeds during the survey period were at or below 5m/s.

Table 2 below presents the attended measurements.

Attended Measurements	Noise Source Level: Event SPL dB(A)		
	L_{eq}	L_{10}	L_{01}
Cyclone at 3m	61	62	63
Nut runner at 20m	52	61	63
Dropping timber at 25m	53	56	58

Table 2: Attended measurement results from existing commercial / industrial operations.

4.0 NOISE CRITERIA

4.1 Road Traffic Noise

The State Development Assessment Provisions (SDAP) Queensland State Code 1 *"Development in a state-controlled road environment"*, Table 1.5: *"Environmental emissions"* sets the following road traffic noise criterion for Accommodation Activities (a relocatable home park is defined as an accommodation activity under the State Code):

Material change of use (accommodation activity)	
Ground floor level requirements adjacent to a state-controlled road or type 1 multi-modal corridor	
PO39 Development minimises noise intrusion from a **state-controlled road** in **private open space**.	**AO39.1** Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum free field acoustic levels in reference table 2 (item 2.2) for **private open space** at the ground floor level; 2. in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO39.2** Development achieves the maximum free field acoustic level in reference table 2 (item 2.2) for **private open space** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.
PO40 Development (excluding a **relevant residential building** or **relocated building)** minimises noise intrusion from a **state-controlled road** in **habitable rooms** at the facade.	**AO40.1** Development (excluding a **relevant residential building** or **relocated building**) provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum building façade acoustic level in reference table 1 (item 1.1) for **habitable rooms**; 2. in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO40.2** Development (excluding a **relevant residential building** or **relocated building**) achieves the maximum building façade acoustic level in reference table 1 (item 1.1) for **habitable rooms** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.
PO41 Habitable rooms (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided.

Above ground floor level requirements (accommodation activity) adjacent to a state-controlled road or type 1 multi-modal corridor	
PO42 Balconies, podiums, and roof decks include: 1. a continuous **solid gap-free structure** or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); 2. highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums, and roof decks.	No acceptable outcome is provided.
PO43 Habitable rooms (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided.

In relation to PO40, PO41 and PO43, The Queensland Development Code (QDC) Mandatory Part (MP) 4.4 *"Buildings in a Transport Noise Corridor"* applies to the residential dwellings; therefore, the criterion cited in Table 1 (Item 1.1) and Table 3 (Item 3.1) of State Code 1 does not apply.

Reference tables

Table 1: Maximum building facade acoustic levels

Applicable use	Acoustic levels
1.1: Accommodation activity	a. ≤60 dB(A) L_{10} (18 hour) façade corrected (measured L90 (8 hour) free field between 10pm and 6am ≤40 dB(A)) OR b. ≤63 dB(A) L_{10} (18 hour) façade corrected (measured L90 (8 hour) free field between 10pm and 6am > 40 dB(A))
1.2: Childcare centre or **educational establishment**	≤58 dB(A) L_{10} (1 hour) façade corrected (maximum hour during normal opening hours)

Table 2: 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)) OR 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**)	

Table 3: Maximum internal acoustic levels

Applicable use	Acoustic levels
3.1: Habitable rooms in **an accommodation activity** (excluding uses addressed in QDC MP4.4)	≤35 dB(A) L_{eq} (1 hour) (maximum hour over 24 hours)
3.2: Indoor education areas and **indoor play areas** in a **childcare centre** or **education establishment**	
3.3: Sleeping rooms in a **childcare centre**	
3.4: Patient care areas in a **hospital**	

4.2 Aircraft Noise Criterion

Toowoomba Regional Council's *"Airport Environs Overlay Code"* outlines the relevant criterion relating to aircraft noise for new residential developments, which is outline below:

Performance outcomes	Acceptable outcomes
Acoustic Amenity[3]	
PO_2 , .Development is appropriately located and designed to prevent adverse impacts from aircraft noise in accordance with Australian Standards AS2021 – Acoustics – Aircraft Noise Intrusion – Building Siting and Construction.	$AO_{2.1}$ Premises are not developed for: (a) dwelling house, multiple dwelling, dual occupancy, retirement facility, tourist park, hospital, health care services, relocatable home park, community residence, child care centre, educational establishment, residential care facility, resort complex, rooming accommodation or rural worker's accommodation on land within the 25 or higher ANEF contour; (b) short term accommodation, community use, hotel, place of worship, rooming accommodation or theatre, on land within the 30 or higher ANEF contour; (c) business activities or commercial uses on land within the 35 or higher ANEF contour.
PO_3 Development for: (a) caretaker's accommodation, community residence, dwelling house, dwelling unit, multiple dwelling, dual occupancy, child care centre, retirement facility, tourist park, educational establishment, hospital, health care services, rooming accommodation, relocatable home park, residential care facility, resort complex or rural worker's accommodation on land situated between the 20 and 25 ANEF contours; (b) short term accommodation, club, community uses, hotel, place of worship or theatre, on land situated between the 20 and 30 ANEF contours; or (c) business activities or commercial uses on land situated between the 20 and 35 ANEF contours; incorporates effective noise attenuation measures which meet Australian Standard AS2021 - Acoustics - Aircraft Noise Intrusion – Building Siting and Construction and Australian Standard AS2107 – Acoustics – Recommended design sound levels and reverberation times for building interiors.	No acceptable outcome is nominated.

Table 3 below presents the appropriate indoor design sound levels from the Australian Standard AS 2021:

Building type and activity	Indoor design sound level, dB(A)
Houses, home units, flats, caravan parks	
Sleeping areas, dedicated lounges	50
Other habitable spaces	55
Bathroom, toilets laundries	60

Table 3: Recommended aircraft noise indoor design sound levels *(Source: AS2021).*

4.3 Offsite Commercial / Industrial Activity Noise

Toowoomba Regional Council's *"Medium Density Residential Code"* outlines the relevant criterion relating to offsite activity for new residential developments, which is outlined below:

Performance outcomes	Acceptable outcomes
PO13 The development is designed so that occupants are not adversely affected by adjoining non-residential uses.	In partial fulfilment of the performance outcome AO13.1 A 1.8m high solid screen fence and 2m wide vegetated buffer is provided along any section of the site boundary that is common with vehicle movement and/or parking areas associated with a non-residential use on an adjoining site.

Further, Toowoomba Regional Council's *"Environmental Standards Code"* outlines the relevant criterion relating to offsite activity for new residential developments, which is outline below:

Performance outcomes	Acceptable outcomes
PO10 Proposed sensitive land uses in close proximity to existing lawful land uses involving significant noise emissions such as entertainment venues, child care centres, industrial zones or other commercial premises are designed and constructed in a manner that achieves acoustic amenity for the users of the development.	AO10.1 The development is designed to achieve the internal noise criterion (Acoustic Quality Objectives) for the particular use as specified within *the Environmental Protection (Noise) Policy 2008.* AO10.2 Where the proposed sensitive land use is not listed in the Environmental Protection (Noise) Policy 2008, the development is designed and constructed to meet the internal sound level design criterion contained in Australian Standard *AS2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors.* AO10.3 Where the sensitive land use is within or adjoining entertainment venues utilising amplified music the applicant has undertaken an acoustic assessment of existing background octave levels and designed the sensitive land use component to mitigate the impacts of low frequency noise (particularly between 31.5Hz and 125Hz).

It is noted the Environmental Protection (Noise) Policy 2008 has been superseded by the Environmental Protection (Noise) Policy 2019.

Schedule 1 of the Environmental Protection (Noise) Policy 2019 provides the following specific indoor *"Acoustic Quality Objectives"* to ensure that the above is achieved:

Column 1	Column 2	Column 3			Column 4
Sensitive receptor	**Time of day**	**Acoustic quality objectives (measured at the receptor) *dB(A)***			**Environmental value**
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
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

5.0 PREDICTED NOISE IMPACTS

5.1 Predicted Road Traffic Noise Impacts

5.1.1 Traffic Volumes

The existing year 2019 (pre Covid-19) traffic volumes for the Bridge Street, including percentage of heavy vehicles, was obtained from the Department of Transport and Main Roads (data provided from the Traffic Analysis and Reporting System (TARS) – refer to Attachment C in Appendix A). The predicted volumes for years 2022 and 2034 assume a 1% compound growth per annum from the 2019 data, given that the calculated 5 and 10-year traffic growth obtained from TARS were negative.

Gazettal Direction

2019 Traffic Volume:	6,548 vehicles per 24 hour, 9.77% heavy vehicles
Predicted 2022 Traffic Volume:	6,746 vehicles per 24 hour, 9.77% heavy vehicles
Predicted 2034 Traffic Volume:	7,602 vehicles per 24 hour, 9.77% heavy vehicles

Against Gazettal Direction

2019 Traffic Volume:	7,170 vehicles per 24 hour, 13.44% heavy vehicles
Predicted 2022 Traffic Volume:	7,387 vehicles per 24 hour, 13.44% heavy vehicles
Predicted 2034 Traffic Volume:	8,324 vehicles per 24 hour, 13.44% heavy vehicles

For modelling purposes, the 18 hour traffic volumes are assumed to be equal to 95% of the 24 hour traffic volumes.

5.1.2 Road Traffic Noise Model Parameters

Road traffic noise predictions were conducted using PEN3D, a CoRTN based model acceptable under the Environmental Protection (Noise) Policy.

The following parameters were used in developing the PEN3D model for the development site:

- 2.5 dB façade correction.
- 70 km/hr posted speed limit.
- Year 2034 traffic volumes presented in Section 5.1.1.
- Dense graded asphalt road surface (no road surface correction).
- CoRTN soft ground cover has been used in the model for grassed / landscaped areas and CoRTN hard ground surface for roads and concrete pavements.
- Existing 0.2m interval ground contours obtained from the ELVIS website (Elevation and Depth – Foundation Spatial Data).
- Development Plans provided in Appendix B.
- Onsite earthworks including finished floor levels provided by Burchills Engineering Solutions (refer to Appendix B)
- Receiver heights taken at 1.5m above finished floor levels.
- Finished floor levels detailed in Tables 4 and 5.
- Road traffic acoustic barriers as detailed in Sketch No 1 of Appendix A.

5.1.3 Modelled Road Traffic Noise Levels –Year 2022 Situation

To verify the road traffic noise prediction model, the existing $L_{A10,18hr}$ traffic noise level was calculated for the logger location and compared to the measured noise level. For PEN3D point calculation sheets refer to Appendix C.

The calculated existing $L_{A10,18hr}$ noise level, approximately 18m from the nearest lane of the Bridge Street is 60.1 dB(A). Compared with the measured $L_{A10,18hr}$ level of 59.3 dB(A), the model is over-predicting by 0.8 dB(A), which is within the allowable 2 dB(A) deviation from measured levels. For PEN3D point calculation sheets refer to Appendix C.

5.1.4 Modelled Road Traffic Noise Levels – Ultimate Year 2034 Situation

Based upon year 2034 traffic volumes, the PEN3D model predicts the following road traffic noise levels as detailed in the following Tables 4 and 5, Figure 5.1.1 (outdoor private open space free-field levels), and Figure 5.1.2 (façade corrected levels).

Two scenarios have been assessed which are as follows:

Scenario 1: No acoustical barriers screening road traffic noise (Table 4).

Scenario 2: Road traffic acoustical barriers as detailed in Sketch No 1 of Section 6.1.1 to mitigate road traffic noise to show compliance with the external private open space criterion of 60 dB(A) $L_{10\ 18hr}$ (Table 5).

NO BARRIERS			
Lot Number	Modelled Finished Floor Level R.L. (m)	BUILDING FAÇADE [Façade Corrected] Predicted Year 2034 $L_{10\ 18hr}$ dB(A)	PRIVATE OPEN SPACE [Free-Field] Predicted Year 2034 $L_{10\ 18hr}$ dB(A)
263	613.30	62	61
264	613.12	63	61
265	612.39	62	60
266	610.83	59	58
267	609.40	58	57
268	612.24	63	62
269	611.83	63	62
270	611.15	65	64
271	611.08	63	62
272	611.42	62	61
273	612.08	63	61
274	612.67	63	62
275	613.35	66	64
276	613.79	65	64
277	614.26	66	64
278	614.61	66	65
279	612.84	51	50
280	614.12	52	50
281	615.40	52	50
282	616.29	52	50
283	615.99	52	51
284	615.40	52	51
285	614.55	52	51
286	613.69	52	51
287	612.84	52	51
288	612.00	52	50
289	611.99	52	51
290	611.91	53	51
291	612.73	53	51
292	613.59	53	51
293	614.32	53	51
294	615.10	53	52
295	615.89	53	52
296	615.88	54	53
297	615.11	54	53
298	614.34	54	52
299	613.59	54	52
300	612.73	54	52
301	611.84	53	52
302	611.76	53	52
303	611.43	54	52
304	611.05	54	53
305	612.37	54	53
306	613.24	54	53
307	613.89	55	53
308	614.65	55	53
309	614.45	55	54
310	613.71	55	54
311	612.88	55	54
312	611.91	55	54
313	610.85	55	53
314	610.75	54	53
315	610.02	54	53
316	609.29	54	53
317	608.62	55	53
318	609.07	55	54
319	610.03	55	54
320	610.88	56	54
321	611.83	56	54
322	612.45	56	54

Table 4: Predicted road traffic noise impact levels across the development.

Noise exceedances above 60 dB(A) $L_{10\ 18hr}$ (free-field) are predicted at the nearest lots to the Bridge Street (Lots 263, 264, and 268 to 278); therefore, acoustical barriers have been modelled, as detailed in Section 6.1.1, to show compliance with the external criterion as presented in Table 5.

ACOUSTIC BARRIERS			
Lot Number	Modelled Finished Floor Level R.L. (m)	BUILDING FAÇADE [Façade Corrected] Predicted Year 2034 $L_{10\ 18hr}$ dB(A)	PRIVATE OPEN SPACE [Free-Field] Predicted Year 2034 $L_{10\ 18hr}$ dB(A)
263	613.30	59	58
264	613.12	60	58
265	612.39	59	58
266	610.83	58	56
267	609.40	57	55
268	612.24	60	59
269	611.83	60	59
270	611.15	57	56
271	611.08	57	55
272	611.42	56	55
273	612.08	57	56
274	612.67	58	56
275	613.35	59	57
276	613.79	58	57
277	614.26	58	57
278	614.61	58	57
279	612.84	51	50
280	614.12	51	50
281	615.40	51	50
282	616.29	52	50
283	615.99	52	51
284	615.40	52	51
285	614.55	52	51
286	613.69	52	50
287	612.84	52	50
288	612.00	51	50
289	611.99	52	50
290	611.91	52	51
291	612.73	52	51
292	613.59	52	51
293	614.32	52	51
294	615.10	53	51
295	615.89	53	51
296	615.88	54	52
297	615.11	54	52
298	614.34	53	52
299	613.59	53	52
300	612.73	53	52
301	611.84	53	51
302	611.76	53	51
303	611.43	53	52
304	611.05	53	52
305	612.37	54	52
306	613.24	54	52
307	613.89	54	53
308	614.65	54	53
309	614.45	55	53
310	613.71	55	53
311	612.88	54	53
312	611.91	54	53
313	610.85	54	52
314	610.75	53	52
315	610.02	53	52
316	609.29	53	52
317	608.62	53	52
318	609.07	54	53
319	610.03	54	53
320	610.88	55	53
321	611.83	55	54
322	612.45	55	54

Table 5: Predicted road traffic noise impact levels across the development, with acoustic barrier treatments to show compliance with the external private open space criterion.

Figure 5.1.1: Free-field ground floor private open space predicted $L_{10\ 18hr}$ noise contours.

No Acoustic Barriers

Figure 5.1.1 Con't): Free-field ground floor private open space predicted $L_{10\ 18hr}$ noise contours.

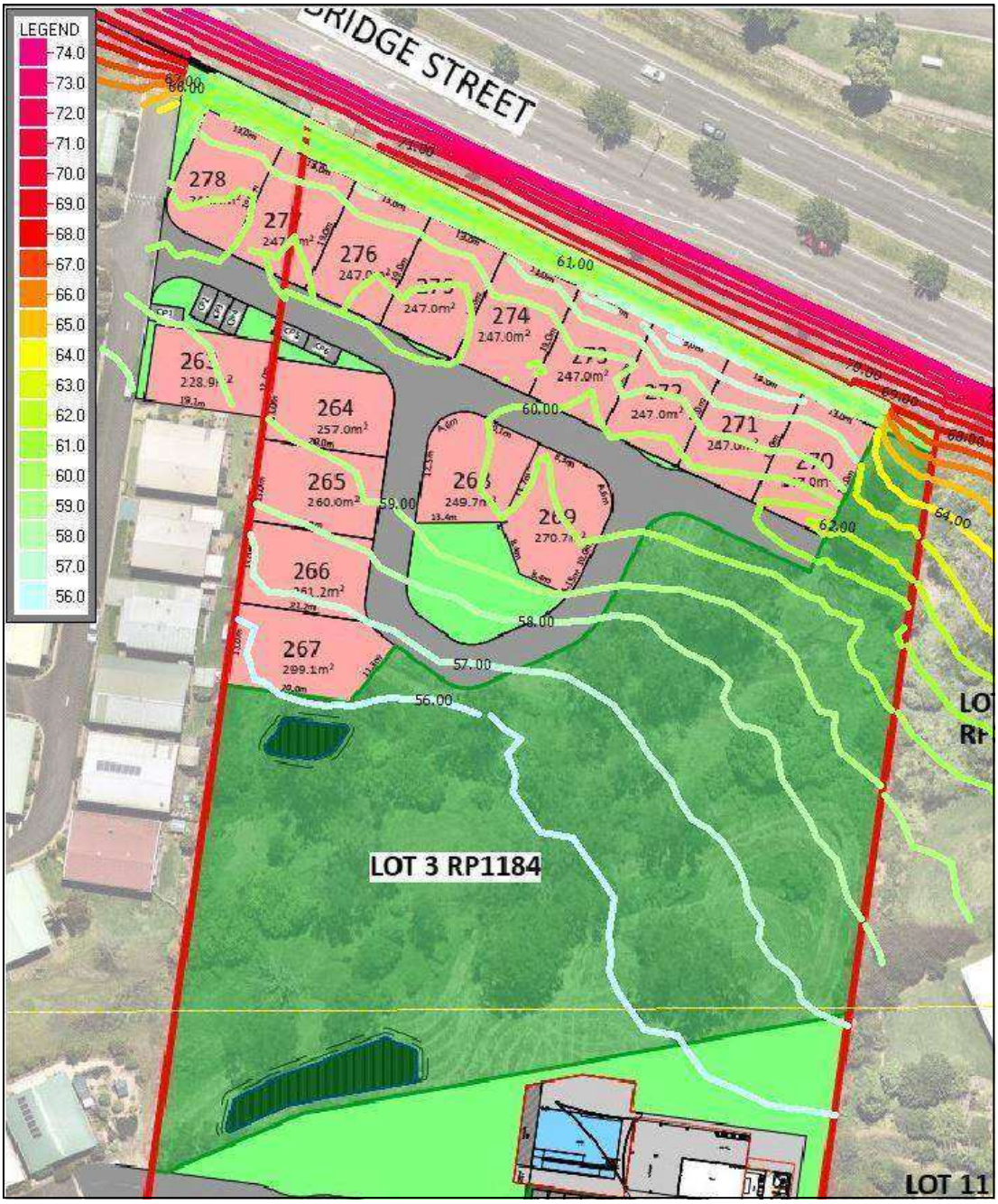
Acoustic Barriers – Refer to Section 6.1.1

Figure 5.1.2: Façade corrected ground floor predicted $L_{10\ 18hr}$ noise contours.

No Acoustic Barriers

Figure 5.1.2 Con't): Façade corrected ground floor predicted $L_{10\ 18hr}$ noise contours.

Acoustic Barriers – Refer to Section 6.1.1



5.2 Modelled Aircraft Noise Impacts

The tabulated aircraft noise levels presented in Australian Standard AS2021 – 2015 *"Acoustic – Aircraft noise intrusion – Building siting and construction"* are used to estimate the impact of noise onto the proposed dwelling from aircraft arriving and departing from Gold Coast Airport.

The predicted aircraft noise impact levels at the subject site are based upon a landing distance (DL) of 500m; a take-off distance (DT) of 1,720m and side distance (DS) of 0m (based upon Google Earth measurements as shown over the page). Corrections were not required for differences in elevation between the development site and the airport.

Table 6 presents the highest estimated aircraft impact levels determined from the procedures set out in the Australian Standard AS2021 for a variety of aircraft types that typically use the Airport.

Noise Source	**Predicted Noise Impacts SPL dB(A)**	
Aircraft Type	**Arrivals**	**Departures**
Cessna 172	72	***
Cessna 182	75	***
Beechcraft Baron 58	85	***
Piper PA38 (Generic 1-engine FP prop)	74	***

*** No noise level value provided in the AS2021 Tables.

Table 6: Predicted aircraft noise impact levels derived from the procedure set out in AS2021.

Given that aircraft departures are not provided for the specific DT and DS in AS2021, onsite attended aircraft noise measurements were undertaken on Friday 9th June 2023 with the arithmetic average L_{max} of aircraft departures at 88 dB(A) recorded.

Figure 5.2: Google aerial showing the distance measurements DL and DT.

Distance measurements (DL, DT and DS) have been determined based upon the following extracts from Section 3.1.3.1 and Figure 3.1 of Australian Standard AS2021 – 2015 *"Acoustic – Aircraft noise intrusion – Building siting and construction":*

3.1.3.1 *Aircraft using straight approach and departure flight paths*

The distance coordinates are determined as follows:

(a) On the appropriate ANEF chart or locality map, extend the centre-line of each runway to a point beyond the building site.

All runways should be taken as relevant and the procedures given carried out to determine the noise levels from aircraft movements on all runways.

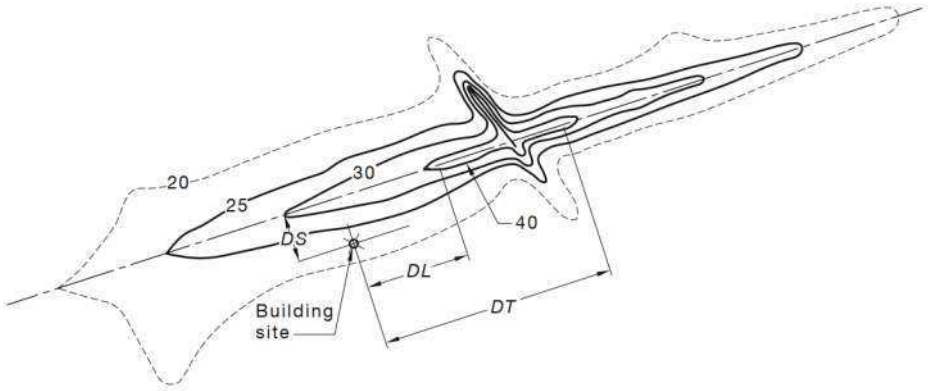
(b) As shown in Figure 3.1, draw a line perpendicular to the extended runway centre-line and passing through the building site, known as 'sideline projection'.

(c) Determine for each runway—

(i) *DS*, the distance in metres from the building site to the extended runway centre-line along the line drawn in Item (b);

(ii) *DL*, the distance in metres from the closer end of the runway to the intersection of the extended runway centre-line and the line drawn in Item (b); and

(iii) *DT*, the distance in metres from the further end of the runway to the intersection of the runway centre-line and the line drawn in Item (b).



DIMENSIONS IN ANEF UNITS

FIGURE 3.1 DETERMINATION OF *DS*, *DL* AND *DT* FOR STRAIGHT FLIGHT PATHS

5.3 Predicted Offsite Commercial / industrial Noise Impacts

All noise source levels used in the assessment have been collected from similar assessments and onsite attended measurements (refer to Section 3.4). All noise levels assessed under the *"Acoustic Quality Objectives"* criterion have been corrected for impulsiveness or tonality as per Australian Standard AS 1055 *"Acoustics-Description and measurement of environmental noise*".

The following noise source levels would typically occur at the adjacent offsite commercial / industrial operations.

Short Duration / Fluctuating Activity/Noise Source	Distance To Source	Event Duration Noise Level, SPL dB(A)		
		L_{eq}	L_{10}	L_{01}
Car door closures	1m	80*	83*	85*
Car starts	1m	73	74	75
Car bypass	1m	68	70	73
Truck engine starts	1m	78	81	83
Truck movements	1m	87	89	90
Truck airbrakes	1m	95*	100*	103*
Forklift	4m	71	74	75
Forklift putting load on truck with reverse	4m	70	72	77
Forklift putting load on truck with reverse with horn blast	4m	77*	80*	97*
Group of people talking outside	1m	65	70	73
Cyclone	3m	66**	67**	68**
Nut runner	20m	57**	66**	68**
Dropping timber	25m	58*	61*	63*
Frontend loader	6m	77	80	82
Waste collection	1m	97*	102*	107*

* Denotes + 5 dB correction for impulsiveness in accordance with AS1055. ** Denotes + 5 dB correction for tonality in accordance with AS1055.

Table 7: Typical noise source levels associated with the offsite commercial / industrial operations.

With regards to the $L_{A10\ 1hr}$ and $L_{A01\ 1hr}$ levels, in many cases, particularly during the night-time period, noise events may not register as L_{A10} or L_{A01} levels if the events do not occur for 10% or 1% of the time period respectively. For example, a 1 second event would have to occur 360 times during a one hour period to register as an L_{A10}, and 36 times during a one hour period to register as an L_{A01} as these noise descriptors are statistically defined. If the events do not occur for the minimum number of iterations (or time period) we have presented the results as "N/A" in Table 8.

Based upon the location of the offsite commercial / industrial operations in relation to the proposed onsite residential lots / future dwellings, we predict the following noise impact levels as presented in Table 8.

It should be stressed that we have assessed noise intruding into bedrooms and living rooms, regardless of operational times of the offsite commercial / industrial uses, given that retirees typically nap during the daytime period in addition to their night-time sleep. By designing for acceptable noise levels inside bedrooms (night-time criterion) and living rooms (daytime and evening criterion), we also ensure that the future commercial / industrial uses proximate to the subject site would not be compromised.

The predicted levels assume that the recommended treatments detailed in Section 6.3 are incorporated into the development. For point source calculations refer to Appendix C.

Fluctuating Noise Source	Predicted Noise Impact, SPL dB(A)					
	$L_{eq\ 1hr}$	$L_{10\ 1hr}$	$L_{01\ 1hr}$	$L_{eq\ 1hr}$	$L_{10\ 1hr}$	$L_{01\ 1hr}$
Nearest Southern Onsite Lots / Future Dwellings	**Nearest Façade**			**Inside Windows Open**		
Car door closures at nearest north hardstand areas	33	N/A	57	26	N/A	50
Car starts at nearest north hardstand areas	26	N/A	47	19	N/A	40
Car bypass at nearest north hardstand areas	26	N/A	43	19	N/A	36
Truck engine starts at nearest north hardstand areas	35	N/A	N/A	27	N/A	N/A
Truck movements at nearest north hardstand areas	54	N/A	70	46	N/A	62
Truck airbrakes at crossover	27	N/A	N/A	19	N/A	N/A
Truck airbrakes at nearest north hardstand areas	40	N/A	N/A	32	N/A	N/A
Forklift at nearest north hardstand areas	52	58	59	44	50	51
Forklift putting load on truck with reverse at nearest north hardstand areas	51	56	61	43	48	53
Forklift putting load on truck with reverse with horn blast at nearest north hardstand areas	35	N/A	N/A	27	N/A	N/A
Group of people talking outside at building	40	45	48	33	38	41
Cyclone outside building	54	55	56	46	47	48
Nut runner outside building	50	65	67	42	57	59
Dropping timber outside building	45	N/A	64	37	N/A	57
Frontend loader at Boral Asphalt northeast hardstand	58	64	66	51	57	59
Waste collection at nearest north hardstand areas	60	N/A	83	53	N/A	76
Combined Leq, Maximum L10 / L01 impacts	**62**	**65**	**70**	**54**	**57**	**62**
Required R_w Ratings to Achieve Indoor Criterion (Windows Closed)				**R_w 30 Living Areas R_w 35 Bedrooms**		
Nearest Eastern Onsite Lots / Future Dwellings	**Nearest Façade**			**Inside Windows Open**		
Car door closures at nearest east hardstand areas	28	N/A	52	21	N/A	45
Car starts at nearest east hardstand areas	21	N/A	42	< 15	N/A	35
Car bypass at nearest east hardstand areas	21	N/A	38	< 15	N/A	30
Truck engine starts at east nearest hardstand areas	33	N/A	N/A	25	N/A	N/A
Truck movements at east nearest hardstand areas	54	N/A	70	46	N/A	62
Truck airbrakes at crossover	21	N/A	N/A	< 15	N/A	N/A
Truck airbrakes at nearest east hardstand areas	36	N/A	N/A	28	N/A	N/A
Forklift at nearest east hardstand areas	47	53	54	40	46	47
Forklift putting load on truck with reverse at nearest east hardstand areas	46	51	56	39	44	49
Forklift putting load on truck with reverse with horn blast at nearest east hardstand areas	30	N/A	N/A	23	N/A	N/A
Group of people talking outside at building	35	40	43	28	33	36
Cyclone outside building	45	46	47	38	39	40
Nut runner outside building	47	62	64	40	55	57
Dropping timber outside building	41	N/A	61	34	N/A	54
Frontend loader at Boral Asphalt northeast hardstand	51	57	59	44	50	52
Waste collection at nearest east hardstand areas	64	N/A	87	56	N/A	79
Combined Leq, Maximum L10 / L01 impacts	**57**	**62**	**70**	**50**	**55**	**62**
Required R_w Ratings to Achieve Indoor Criterion (Windows Closed)				**R_w 28 Living Areas R_w 33 Bedrooms**		
Applicable Criterion				**Acoustic Quality Objectives**		
Living Areas				**35**	**40**	**45**
Bedrooms				**35**	**40**	**45**

Table 8: Predicted offsite commercial / industrial operations noise impacts at proposed residential receptors.

Fluctuating Noise Source	Predicted Noise Impact, SPL dB(A)					
	$L_{eq\ 1hr}$	$L_{10\ 1hr}$	$L_{01\ 1hr}$	$L_{eq\ 1hr}$	$L_{10\ 1hr}$	$L_{01\ 1hr}$
Setback Southern Onsite Lots / Future Dwellings	**Nearest Façade**			**Inside Windows Open**		
Car door closures at nearest north hardstand areas	24	N/A	48	17	N/A	41
Car starts at nearest north hardstand areas	17	N/A	38	< 15	N/A	31
Car bypass at nearest north hardstand areas	18	N/A	35	< 15	N/A	28
Truck engine starts at nearest north hardstand areas	26	N/A	N/A	19	N/A	N/A
Truck movements at nearest north hardstand areas	46	N/A	62	39	N/A	55
Truck airbrakes at crossover	25	N/A	N/A	18	N/A	N/A
Truck airbrakes at nearest north hardstand areas	32	N/A	N/A	25	N/A	N/A
Forklift at nearest north hardstand areas	44	50	51	36	42	43
Forklift putting load on truck with reverse at nearest north hardstand areas	43	48	53	35	40	45
Forklift putting load on truck with reverse with horn blast at nearest north hardstand areas	27	N/A	N/A	19	N/A	N/A
Group of people talking outside at building	31	36	39	24	29	32
Cyclone outside building	47	48	49	39	40	41
Nut runner outside building	42	57	59	35	50	52
Dropping timber outside building	37	N/A	56	29	N/A	49
Frontend loader at Boral Asphalt northeast hardstand	55	61	63	48	54	56
Waste collection at nearest north hardstand areas	54	N/A	77	47	N/A	70
Combined Leq, Maximum L10 / L01 impacts	**57**	**61**	**63**	**50**	**54**	**56**
Required R_w Ratings to Achieve Indoor Criterion (Windows Closed)				**R_w 25 Living Areas (Standard) R_w 30 Bedrooms**		
Nearest Northern Onsite Lots / Future Dwellings	**Nearest Façade**			**Inside Windows Open**		
Car door closures at nearest east hardstand areas	23	N/A	47	15	N/A	39
Car starts at nearest east hardstand areas	16	N/A	37	< 15	N/A	29
Car bypass at nearest east hardstand areas	18	N/A	35	< 15	N/A	27
Truck engine starts at east nearest hardstand areas	< 15	N/A	N/A	< 15	N/A	N/A
Truck movements at east nearest hardstand areas	33	N/A	49	26	N/A	42
Truck airbrakes at crossover	28	N/A	N/A	20	N/A	N/A
Truck airbrakes at nearest east hardstand areas	27	N/A	N/A	20	N/A	N/A
Forklift at nearest east hardstand areas	39	45	46	32	38	39
Forklift putting load on truck with reverse at nearest east hardstand areas	38	43	48	31	36	41
Forklift putting load on truck with reverse with horn blast at nearest east hardstand areas	22	N/A	N/A	< 15	N/A	N/A
Group of people talking outside at building	24	29	32	16	21	24
Cyclone outside building	30	31	32	23	24	25
Nut runner outside building	36	51	53	28	43	45
Dropping timber outside building	30	N/A	50	23	N/A	42
Frontend loader at Boral Asphalt northeast hardstand	38	44	46	30	36	38
Waste collection at nearest east hardstand areas	43	N/A	66	35	N/A	58
Combined Leq, Maximum L10 / L01 impacts	**45**	**51**	**53**	**37**	**43**	**45**
Required R_w Ratings to Achieve Indoor Criterion (Windows Closed)				**R_w 14 Living Areas (Standard) R_w 19 Bedrooms (Standard)**		
Applicable Criterion				**Acoustic Quality Objectives**		
Living Areas				**35**	**40**	**45**
Bedrooms				**35**	**40**	**45**

Table 8 (Con't): Predicted offsite commercial / industrial operations noise impacts at proposed residential receptors.

For impacts at onsite dwellings (refer to Table 8) we have provided internal impacts with windows and doors open, and R_w ratings required to achieve the indoor criterion (windows and doors closed). We note that 4mm glass in standard operable window and sliding door frames typically achieve a minimum R_w rating of approximately 25; with standard light-weight external walls and standard pitched roofs over a ceiling of 10mm plasterboard achieve R_w ratings of 33 - 35. **Regardless, based on the predicted aircraft noise impacts detailed in Section 6.2, the R_w ratings cited for aircraft noise far exceed those determined in offsite commercial / industrial noise. Therefore, the building shell treatment R_w ratings for aircraft noise are to be incorporated into the future onsite dwellings.**

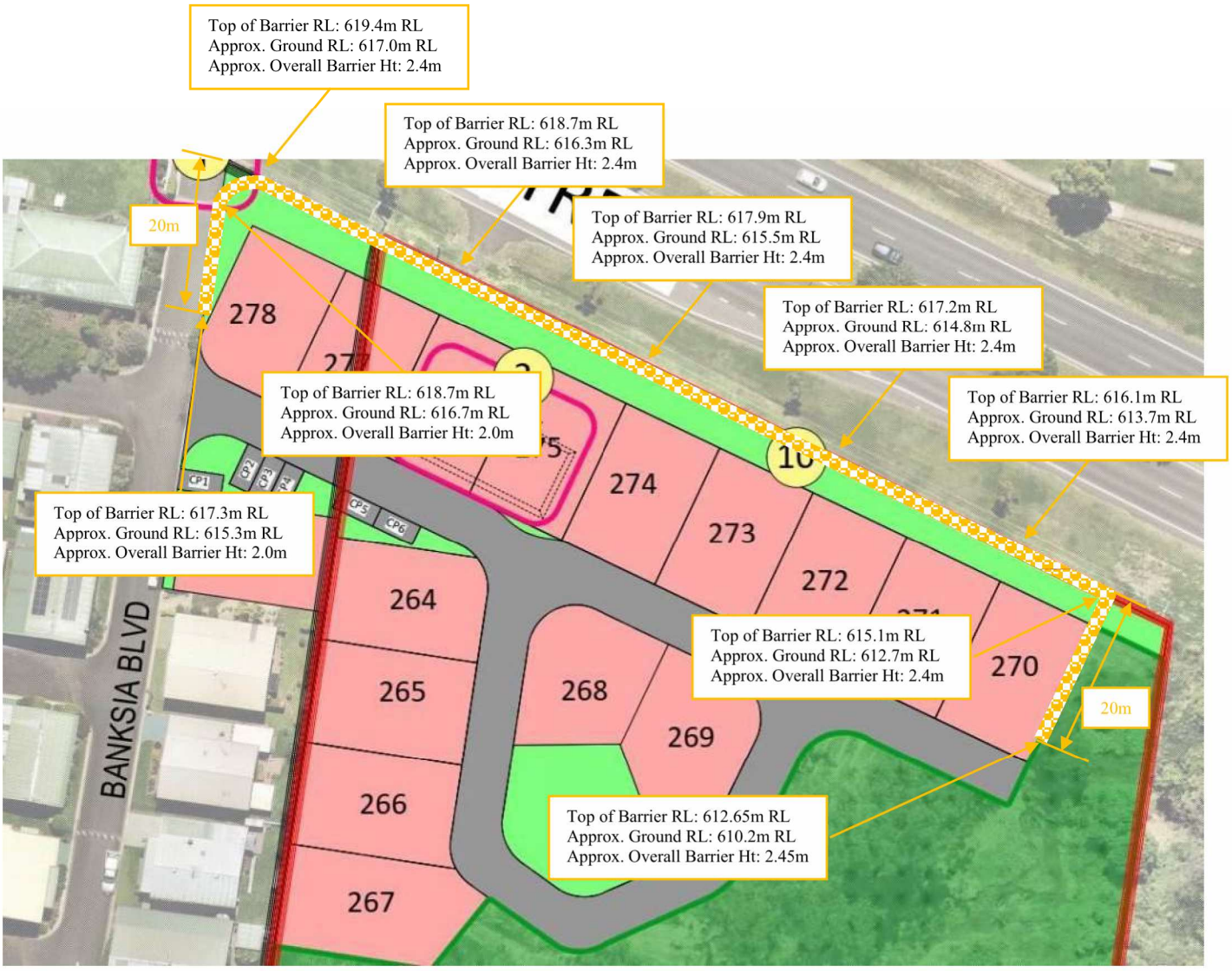
6.0 RECOMMENDED ACOUSTIC TREATMENTS

6.1 Recommended Acoustical Treatments for Road Traffic Noise

6.1.1 Recommended Acoustic Barriers

We recommended constriction of the acoustic barrier, as part of Stage 1, as detailed in Sketch 1, which is predicted to show compliance with the free-field noise criterion presented in Section 4.1.

Sketch 1: Recommended Road Traffic Acoustic Barrier (Not to Scale).



ACOUSTIC TREATMENT LEGEND – ROAD TRAFFIC NOISE

Acoustic barrier to achieve the *"Top of Barrier R.L"* or the *"Overall Barrier Ht"*, as detailed in the sketch above, whichever is higher.

Road traffic noise barriers are to be constructed in accordance with Technical Specification MRTS15 *"Noise Fences"* and Chapter 7 *"Integrated Noise Barrier Design"* of the *"Transport Noise Management Code of Practice – Volume 1 Road Traffic Noise"*, Department of Transport and Main Roads, 2013. Barrier should be free of holes or gaps, including the ground level junction.

6.1.2 Recommended Acoustic Building Shell Treatments

To meet PO41, habitable rooms of relevant residential building are required to meet the Queensland Development Code *"Mandatory Part 4.4 – buildings in transport noise corridor"*. The QDC MP4.4 states the following with regards to acoustic treatments to mitigate road traffic noise:

"The external envelope of each habitable room in a relevant residential building must comply with the minimum R_W[1] for each building component specified in Schedule 1 to achieve a minimum transport noise reduction level for the relevant noise category by:

(a) using materials specified in Schedule 2 (of the Development Code)*;*

OR

(b) using materials with manufacturer's specifications[2] *that, in combination, achieve the minimum Rw value for the relevant building component and applicable noise category."*

The predicted Noise Categories for the noise affected dwellings are presented in Figure 6.1.1 based upon the predicted impacts presented in Section 5.1.4 for the acoustical barrier scenario (Scenario 2, and Table 5). The specific Noise Categories in Figure 6.1.1 and the requirements of Schedule 1 of the Development Code (as detailed in Table 9 of this report) should be used in combination to determine the specific building shell treatments for the habitable rooms of the proposed development.

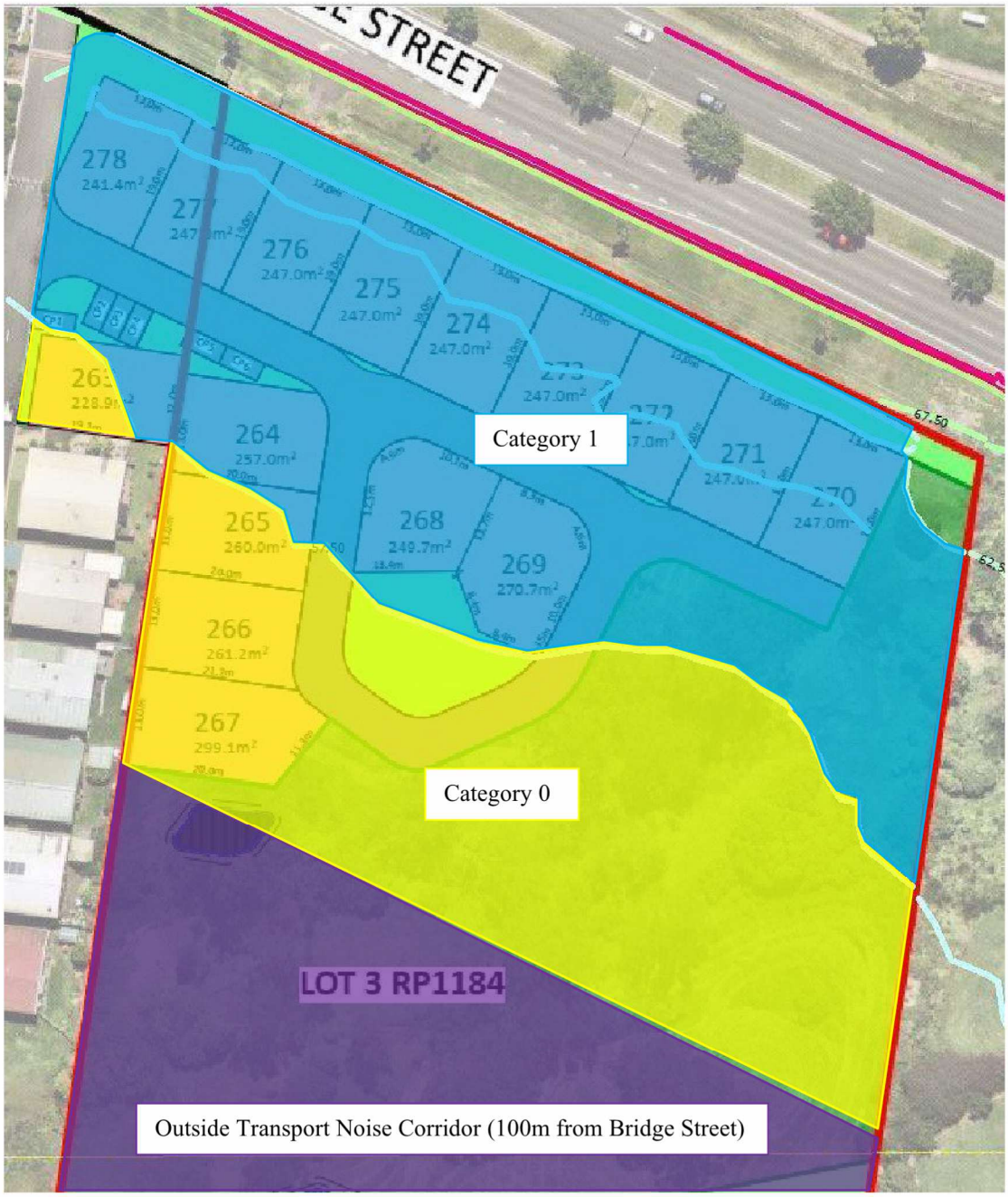
It is noted that based on the predicted aircraft noise impacts, the R_w ratings cited for aircraft noise (refer to Section 6.2) far exceed those determined for control of road traffic noise. Therefore, the building shell treatment R_w ratings for aircraft noise are to be incorporated into the future onsite dwellings.

Under the meaning of *"Transport Noise Reduction"*, the Code states that *"the predicted levels of transport noise will be achieved only when doors, windows and other openings in the relevant parts of the building's external envelope are closed"*. It is noted that there are requirements under the Building Code of Australia for ventilation that may need to be reviewed if external openings are closed to exclude road noise intrusion. Habitable rooms with operable windows or sliding doors along façades that are predicted to be within the Noise Category 0 zone can remain open for the purposes of fresh air ventilation to the relevant spaces.

[1] R_w means the *"Weighted Sound Reduction Index"* as specified in ISO 140-3.

[2] Manufacturers' Specifications means specifications that have been measured in accordance with AS/NZS ISO 717.1 for a material or system and have been approved by a registered testing Authority.

Figure 6.1.1: Recommended Noise Categories Contours to Mitigate Road Traffic Noise (Not to Scale).



Category 1

Category 0

Schedule 1

Noise category	Minimum *transport noise reduction* (*dB (A)*) required for *habitable rooms*	Component of building's *external envelope*	Minimum R_w 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 total area of glazing for a *habitable room* is greater than 1.8m²)
			35 (where total area of glazing for a *habitable room* is less than or equal to 1.8m²)
		External walls	47
		Roof	41
		Floors	45
		Entry doors	33
Category 2	30	Glazing	35 (where total area of glazing for a *habitable room* is greater than 1.8m²)
			32 (where total area of glazing for a *habitable room* is less than or equal to 1.8m²)
		External walls	41
		Roof	38
		Floors	45
		Entry doors	33
Category 1	25	Glazing	27 (where total area of glazing for a *habitable room* is greater than 1.8m²)
			24 (where total area of glazing for a *habitable room* is less than or equal to 1.8m²)
		External walls	35
		Roof	35
		Entry Doors	28
Category 0	No additional acoustic treatment required – standard building assessment provisions apply.		

Table 9: Relevant extract from Schedule 1 from the *"Mandatory Part 4.4 – buildings in transport noise corridor"*.

6.2 Recommended Acoustical Treatments for Aircraft Noise

To ensure compliance with the internal noise criterion, we have recommended acoustical performance ratings to the building shell as detailed in Table 10, which are based upon the highest predicted level of 88 dB(A) from Australian Standard AS2021:2015.

Examples of typical construction have not been provided as it is the minimum R_w ratings for building components listed in Table 10 that are to be achieved. As each system manufacturer uses a different **design, acoustical performance varies accordingly. NOTE: The Designer / Builder must check with building materials supplier that systems proposed meet the required R_w rating as defined in Table 10. It is strongly recommended that the materials supplier provide documentary evidence that the system supplied meets the required acoustical performance rating (e.g. test report from a NATA certified laboratory, or an opinion from a suitably qualified expert in the field of building acoustics).**

High performance glazing R_w systems (most glazings expected to be double glazing based on the assessed floor / glazing areas) can be obtained from AWS Architectural Window Systems Pty Ltd (0458 014 449). High performance external wall systems can be obtained from James Hardie (13 11 03), and the roof / ceiling systems from the Knauf or CSR (i.e. Knauf Technical Manual and the CSR Redbook).

It is noted that glazing R_w requirements can be reduced by reducing overall glazing areas. For instance, halving a room's glazing area will result in a drop of 3 R_w points.

Bedrooms, study, media rooms should be carpeted (not tiled / vinyl / timber) and should have curtains installed rather than blinds (curtains would typically provide higher noise absorption compared to blinds) to minimise reverberation times.

Provision for air conditioning or sealed mechanical ventilation (i.e. ducted air-conditioning) is required to all habitable rooms such as living areas and bedrooms affected by aircraft noise (i.e. rooms listed in Table 10 except bathrooms, ensuites, and toilets) to allow occupants to close windows and doors and still have a fresh supply of air. The installed plant should not reduce the acoustic performance of the building shell.

Building treatments for aircraft noise were determined by using the calculation methods detailed in Australian Standard AS2021 *"Acoustics – Aircraft Noise Intrusion – Building Siting and Construction"*. Calculations for building treatment determination are presented in Appendix C.

As cited in AS2021, *"as high levels of aircraft noise tend to be dominated by low frequency components, R_w ratings alone are note a reliable guide as to the attenuation properties of building components. The full spectrum information for the building components should be consulted where ANR in excess of 30 is required"*. An acceptable means of mitigating the low frequency component of the noise impact is to install building elements (i.e. glazing, walls, and roof / ceiling) that have an $R_w + C_{tr}$ value. For example, a bedroom with a glazing R_w rating of 40, the acceptable $R_w + C_{tr}$ value would also be 40.

530 Bridge Street, Wilsonton Space	Building Component	$R_w + C_{tr}$
Crimson Modified		
Living / Dining / Kitchen / Study	Entry Door	**30**
	Sliding Door	**36**
	Windows	**36**
	External Wall	**45**
	Roof / Ceiling	**53**
Master Bedroom	Windows	**39**
	External Wall	**49**
	Roof / Ceiling	**54**
Ensuite	Windows	**28**
	External Wall	**39**
	Roof / Ceiling	**44**
Bedroom 2	Windows	**39**
	External Wall	**47**
	Roof / Ceiling	**54**
Bathroom	Windows	**28**
	External Wall	**38**
	Roof / Ceiling	**44**
Laundry	Door	**34**
	External Wall	**37**
	Roof / Ceiling	**44**

Table 10: Acoustic building shell treatments $R_w + C_{tr}$ for aircraft noise.

Based upon the R_w ratings required, double glazing is expected for most habitable rooms, with multiple layers of plasterboard for external walls and the roof / ceiling system.

High performance glazing R_w systems (most glazings expected to be double glazing based on the assessed floor / glazing areas) can be obtained from AWS Architectural Window Systems Pty Ltd (0458 014 449). High performance external wall systems can be obtained from James Hardie (13 11 03), and the roof / ceiling systems from the Knauf or CSR (i.e. Knauf Technical Manual and the CSR Redbook).

NOTE: The Designer / Builder must check with building materials supplier that systems proposed meet the required R_w rating as defined in Table 10. It is strongly recommended that the materials supplier provide documentary evidence that the system supplied meets the required acoustical performance rating (e.g. test report from a NATA certified laboratory, or an opinion from a suitably qualified expert in the field of building acoustics).

Should house designs change, additional noise assessments should be undertaken.

530 Bridge Street, Wilsonton Space	Building Component	$R_w + C_{tr}$
Oakley Modified		
Living / Dining / Kitchen	Entry Door	**31**
	Sliding Door	**35**
	Windows	**34**
	External Wall	**42**
	Roof / Ceiling	**53**
Master Bedroom	Windows	**41**
	External Wall	**50**
	Roof / Ceiling	**54**
Ensuite	Windows	**27**
	External Wall	**39**
	Roof / Ceiling	**44**
Bedroom 2	Windows	**42**
	External Wall	**50**
	Roof / Ceiling	**54**
Bedroom 3	Windows	**42**
	External Wall	**50**
	Roof / Ceiling	**54**
Bathroom	External Wall	**39**
	Roof / Ceiling	**44**
Laundry	External Wall	**41**
	Roof / Ceiling	**44**

Table 10 (Con't): Acoustic building shell treatments $R_w + C_{tr}$ for aircraft noise.

Based upon the R_w ratings required, double glazing is expected for most habitable rooms, with multiple layers of plasterboard for external walls and the roof / ceiling system.

High performance glazing R_w systems (most glazings expected to be double glazing based on the assessed floor / glazing areas) can be obtained from AWS Architectural Window Systems Pty Ltd (0458 014 449). High performance external wall systems can be obtained from James Hardie (13 11 03), and the roof / ceiling systems from the Knauf or CSR (i.e. Knauf Technical Manual and the CSR Redbook).

NOTE: The Designer / Builder must check with building materials supplier that systems proposed meet the required R_w rating as defined in Table 10. It is strongly recommended that the materials supplier provide documentary evidence that the system supplied meets the required acoustical performance rating (e.g. test report from a NATA certified laboratory, or an opinion from a suitably qualified expert in the field of building acoustics).

Should house designs change, additional noise assessments should be undertaken.

530 Bridge Street, Wilsonton Space	Building Component	$R_w + C_{tr}$
Community Building		
Multi-purpose Room + Bar	Bifold Window	**34**
	Stacker Doors	**40**
	Sldiing Door	**37**
	Windows	**37**
	External Wall	**46**
	Roof / Ceiling	**54**
Library / Craft Room	Windows	**39**
	External Wall	**45**
	Roof / Ceiling	**51**

Table 10 (Con't): Acoustic building shell treatments $R_w + C_{tr}$ for aircraft noise.

Based upon the R_w ratings required, double glazing is expected for most habitable rooms, with multiple layers of plasterboard for external walls and the roof / ceiling system.

High performance glazing R_w systems (most glazings expected to be double glazing based on the assessed floor / glazing areas) can be obtained from AWS Architectural Window Systems Pty Ltd (0458 014 449). High performance external wall systems can be obtained from James Hardie (13 11 03), and the roof / ceiling systems from the Knauf or CSR (i.e. Knauf Technical Manual and the CSR Redbook).

NOTE: The Designer / Builder must check with building materials supplier that systems proposed meet the required R_w rating as defined in Table 10. It is strongly recommended that the materials supplier provide documentary evidence that the system supplied meets the required acoustical performance rating (e.g. test report from a NATA certified laboratory, or an opinion from a suitably qualified expert in the field of building acoustics).

Should house designs change, additional noise assessments should be undertaken.

6.2 Recommended Acoustical Treatments for Offsite Commercial / Industrial Noise

The requirements for control of air traffic noise far exceeds the requirements for control of industrial noise intrusion. To control industrial noise intrusion, we recommend that the following acoustic treatments and management controls be incorporated into the development:

- Construction of the acoustic building shell treatments detailed in Section 6.2 of this report (Aircraft noise) including the provision for air conditioning or sealed mechanical ventilation to habitable rooms (i.e. bedrooms and living areas) to allow occupants to be able to close windows and doors to exclude offsite activity noise.

- Construction of the acoustic barriers as detailed in Sketch 2 below. Barriers are to be free of gaps and holes including between the base of the barriers and the ground.

Sketch 2: Recommended Offsite Commercial / Industrial Acoustic Barrier (Not to Scale).

ACOUSTIC TREATMENT LEGEND

Recommended 1.8m high acoustic barriers constructed above the existing or finished ground at the barrier alignment, whichever is higher (i.e. top of retaining walls). Barriers are to be free of gaps and holes, including no gaps between the ground and the base of the barrier. Typical materials include earth berms, 19mm lapped timber fence (40% overlap), 9mm FC sheet, toughened glass, Perspex, masonry, or a combination of the above (a minimum surface mass of 12 kg/m^2 is required).

7.0 DISCUSSION

7.1 Road Traffic Noise

In relation to Items PO39, we have recommended acoustic barriers, to be constructed at Stage 1 of the development, to show compliance with the external private open space noise criterion of 60 dB(A) $L_{10\ 18hr}$ (free-field).

In relation to PO40, PO41 and PO43, the onsite dwellings are deemed relevant residential buildings; therefore, the Queensland Development Code (QDC) Mandatory Part (MP) 4.4 *"Buildings in a Transport Noise Corridor"* applies; and the criterion cited in Table 1 (Item 1.1) and Table 3 (Item 3.1) of State Code 1 do not apply. Based upon 2034 road traffic volumes and through 3D traffic noise modelling, road traffic noise levels are predicted to impact the nearest and/or most exposed habitable rooms at levels above the *"Transport Noise Corridor Category 0"* criterion of 57 dB(A) $L_{A10\ 18hr}$; hence building shell treatments are required in accordance with the Development Code Mandatory Part 4.4.

This assessment provides specific Transport Noise Corridor Categories for the proposed dwellings. The revised Noise Category classifications apply to the Building Application stage of the Development. **Regardless of the above Noise Categories, based on the predicted aircraft noise impacts, the R_w ratings cited for aircraft noise (refer to Section 6.2) far exceed those determined in road traffic noise. Therefore, the building shell treatment R_w ratings for aircraft noise are to be incorporated into the future onsite dwellings.**

Under the meaning of *"Transport Noise Reduction"*, the Code states that *"the predicted levels of transport noise will be achieved only when doors, windows and other openings in the relevant parts of the building's external envelope are closed"*. It is noted that there are requirements under the Building Code of Australia for ventilation that may need to be reviewed. Habitable rooms with operable windows or sliding doors along façades that are predicted to have a Noise Category 0; could remain open for the purposes of fresh air ventilation to the relevant spaces.

If finished ground levels change more than ±200mm from existing ground levels (refer to Tables 4 and 5 for modelled building finish floor levels) than an additional revised road traffic noise assessment should be undertaken.

7.2 Aircraft Noise

The site is located approximately 500m to the northwest of the Darling Downs Aero Clubs main runway, and based upon Toowoomba City Council's mapping, is within the ANEF 20 - 25 contour. Therefore, aircraft noise impacts have been assessed in accordance with Australian Standard AS2021 – 2015 *"Acoustic – Aircraft noise intrusion – Building siting and construction"*. Measured levels of aircraft take-offs ranged up to 88 dB(A), with the prediction model of aircraft landings ranging up to 85 dB(A).

To ensure compliance with the internal noise criterion, we have recommended acoustical performance ratings ($R_w + C_{tr}$) to the building shell. Based upon the calculated $R_w + C_{tr}$ ratings required, double glazing is required for most habitable rooms, with multiple layers of plasterboard for external walls and the roof / ceiling system. Glazing requirements can be reduced by reducing overall glazing areas. For instance, halving a room's glazing area will result in a drop of 3 R_w points (in many cases, however, this will not result in avoidance of double glazings).

The Builder will need to check with the element supplier that the system/s proposed achieves the required acoustical $R_w + C_{tr}$ performance ratings detailed in Table 10. High performance glazing R_w systems can be obtained from AWS Architectural Window Systems Pty Ltd (0458 014 449). High performance external wall systems can be obtained from James Hardie (13 11 03), and the roof / ceiling systems from the Knauf or CSR (i.e. Knauf Technical Manual and the CSR Redbook).

Bedrooms, study, media rooms should be carpeted (not tiled / vinyl / timber) and should have curtains installed rather than blinds (curtains would typically provide higher noise absorption compared to blinds) to minimise reverberation times.

Provision of air conditioning or sealed mechanical ventilation is also required to all habitable rooms to allow occupants to close windows and doors. The installed plant should not reduce the acoustic performance of the building shell.

NOTE: The Designer / Builder must check with building materials supplier that systems proposed meet the required R_w rating as defined in Table 10. It is strongly recommended that the materials supplier provide documentary evidence that the system supplied meets the required acoustical performance rating (e.g. test report from a NATA certified laboratory, or an opinion from a suitably qualified expert in the field of building acoustics).

Should house designs change, additional noise assessments should be undertaken.

7.3 Offsite Commercial / Industrial Activity Noise

In accordance with AO12.1 of the *"Medium Density residential Code"* we have recommended a 1.8m high acoustic barrier between the offsite commercial / industrial operations and the proposed nearest onsite lots / dwellings. The proposed development also includes a minimum 7.0m wide landscape buffer along the common boundaries with the commercial / industrial uses.

In accordance with AO10.1 of the *"Environmental Standards Code"*, to achieve the internal *"Acoustic Quality Objectives"* of the Environmental Protection (Noise) Policy 2019, we have recommended upgraded acoustic building shell treatments to the future onsite dwellings. **As noted previously, based on the predicted aircraft noise impacts detailed in Section 6.2, the R_w ratings cited for aircraft noise far exceed those determined in offsite commercial / industrial noise. Therefore, the building shell treatment R_w ratings for aircraft noise are to be incorporated into the future onsite dwellings. This aircraft noise treatment will result in noise intrusion levels from industrial activity well below the indoor noise criteria.**

8.0 CONCLUSIONS

This report is in response to a request by Hometown Australia Communities for a revised environmental noise assessment of a proposed relocatable home park expansion along Bridge Street in Wilsonton.

This report is a revision to a previous assessment (CRGref: 22143 report REV 3 dated June 2023) and is required due to changed dwelling plans, and to respond Item 2 of Toowoomba Regional Council's Information Request dated 7th August 2023. Furthermore, in the context of Item 7 of the Information Request, the applicant has resolved to only include two dwelling types: a two-bedroom option and a three-bedroom option. The acoustic assessment has been updated to address these two dwelling types.

Noise from air traffic is the main impact at the site, and the requirements for acoustical treatment to control noise intrusion from air traffic far exceeds that needed for control of road traffic or industrial activity.

Based upon the assessed attached Development Plans, the proposal can be shown to be with acceptable levels of the adopted noise criterion subject to the recommended treatments detailed in Section 6 being incorporated into the development.

Report Reviewed By:

JAY CARTER BSc
Director

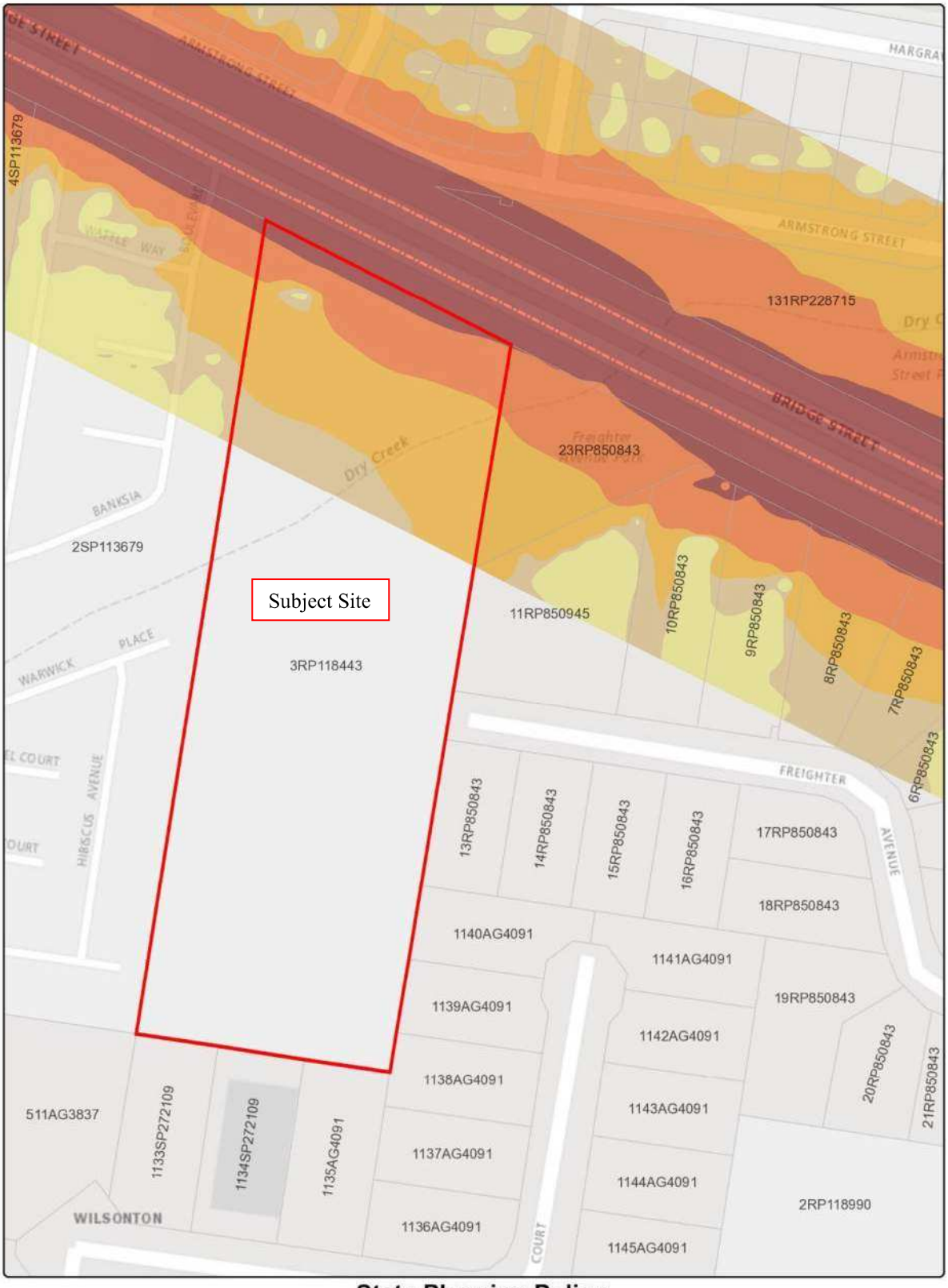
Report Compiled by:

Matthew Lopez BEng
Consultant

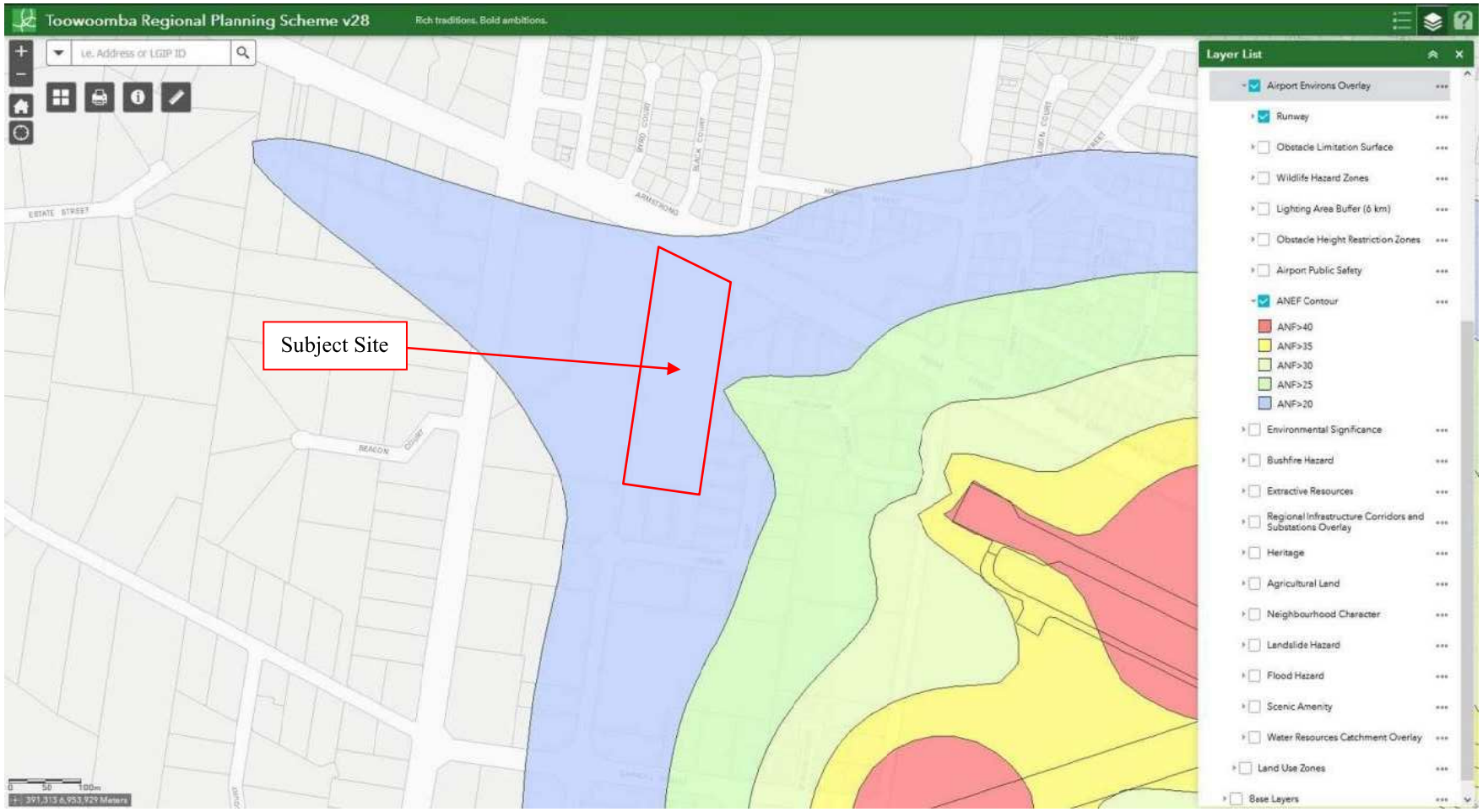
APPENDIX A

Attachments, Subject Site, and Logger Location

Attachment A: Results from the Queensland Government ’s Interactive Mapping System.



Attachment B: Subject Site Location and ANEF Contours (Toowoomba Regional Planning Scheme V28).



Attachment C: TMR TARS Traffic Data for Ring Road – Year 2019.

Queensland Government

25-Aug-2020 17:00

Traffic Analysis and Reporting System

AADT Segment Report

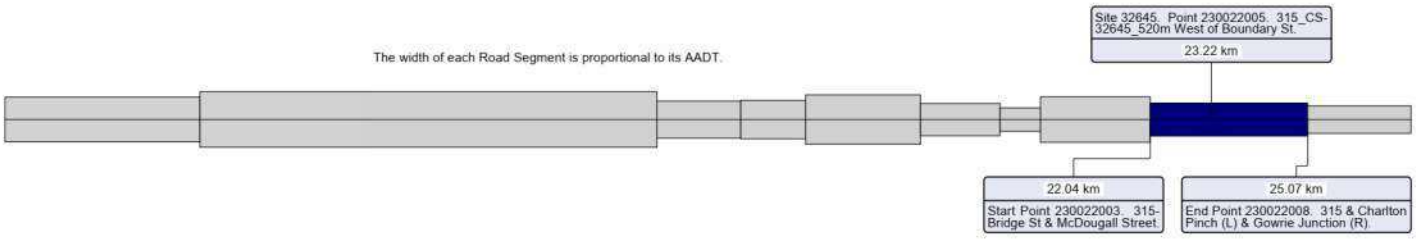
Area 402 - Darling Downs District Road Section 315 - TOOWOOMBA CONNECTION ROAD

Road Segment from 22.040km to 25.070km Segment Site 32645 Traffic Year 2019 Data Collection Year 2019

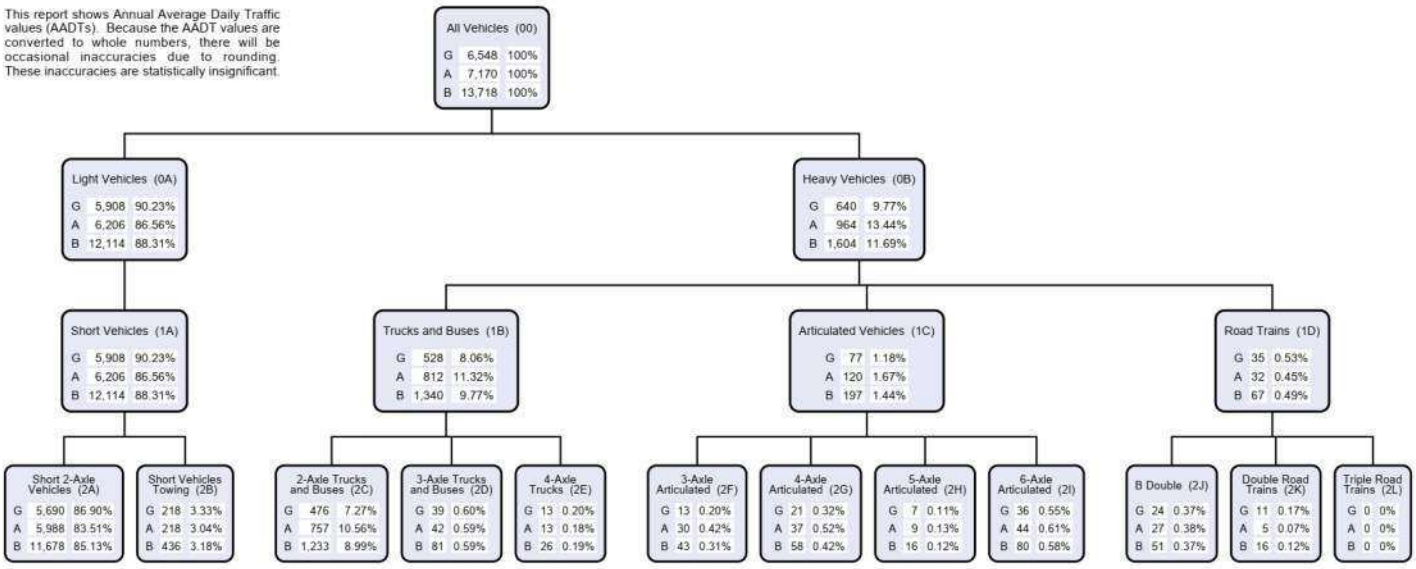
TARS

Page 2 of 2 (2 of 7)

The width of each Road Segment is proportional to its AADT.



This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



Queensland Government

25-Aug-2020 17:00

Traffic Analysis and Reporting System

Annual Volume Report

TARS

Page 2 of 3 (5 of 7)

Area	402 - Darling Downs District
Road Section	315 - TOOWOOMBA CONNECTION ROAD
Site	32645 - 315-550m West of Boundary Rd
Thru Dist	23.22
Type	C - Coverage
Stream	TB - Bi-directional traffic flow

Year	2019	Growth last Year	-2.92%
AADT	13,718	Growth last 5 Yrs	-0.72%
Avg Week Day	14,541	Growth last 10 Yrs	
Avg Weekend Day	11,248		

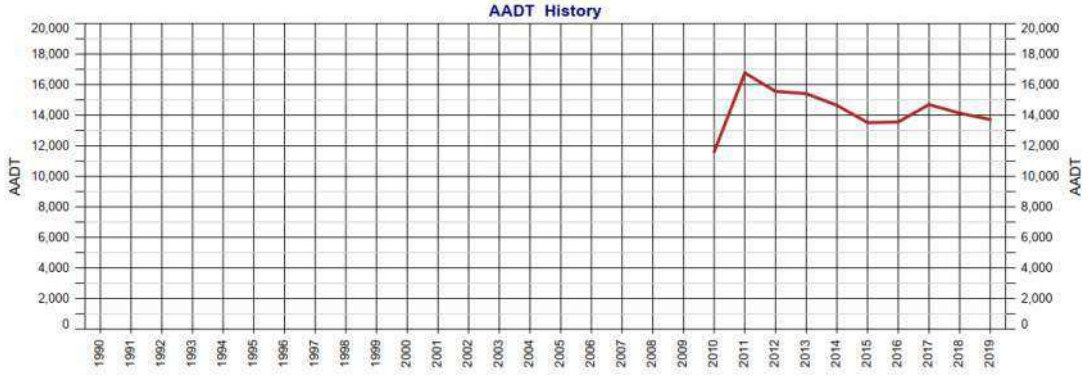


Figure No. 1: Subject Site Location (Google Maps).

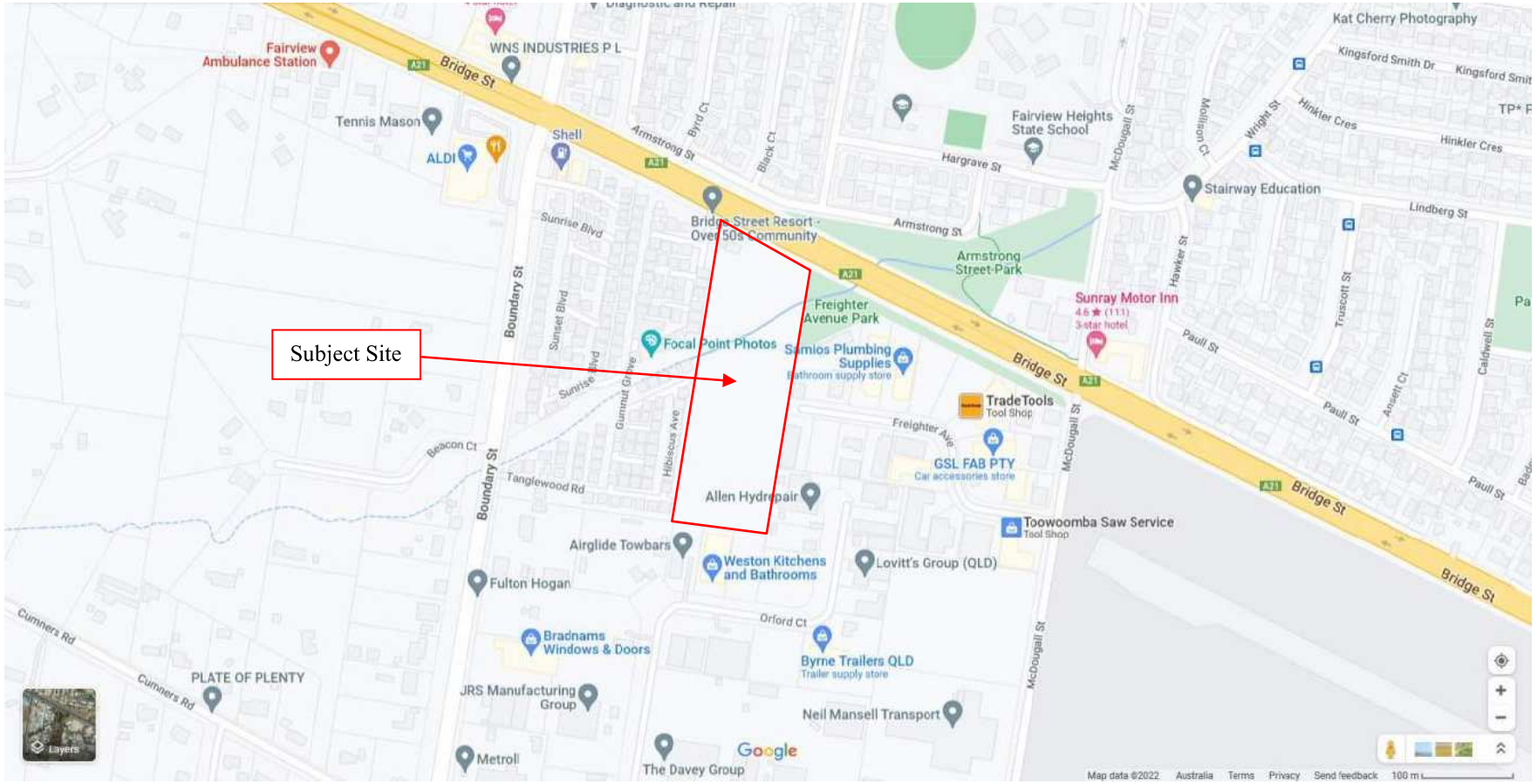


Figure No. 2: Subject Site and Noise Monitoring Location (QLD Globe).

APPENDIX B

Development Plans

PARKING AREA	NO.OF CAR PARKS
A	3
B	1
C	1
D	5
E	5
F	3
G	7
H	2
I	3
J	4
K	2
L	3
M	2
N	1
O	13
TOTAL	55

N

HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

- EXISTING SITE BOUNDARY
- EXPANSION SITE BOUNDARY
- HOUSE NUMBERS
- CARPARKING AREA
- A1 EXISTING DWELLING ON LOT 3 RP1184

EXISTING TOTAL NO OF SITES ON LOT 2 SP113679 & LOT 4 SP113679 = 185 SITES

BRIDGE STREET WILSONTON

PROJECT
BRIDGE STREET

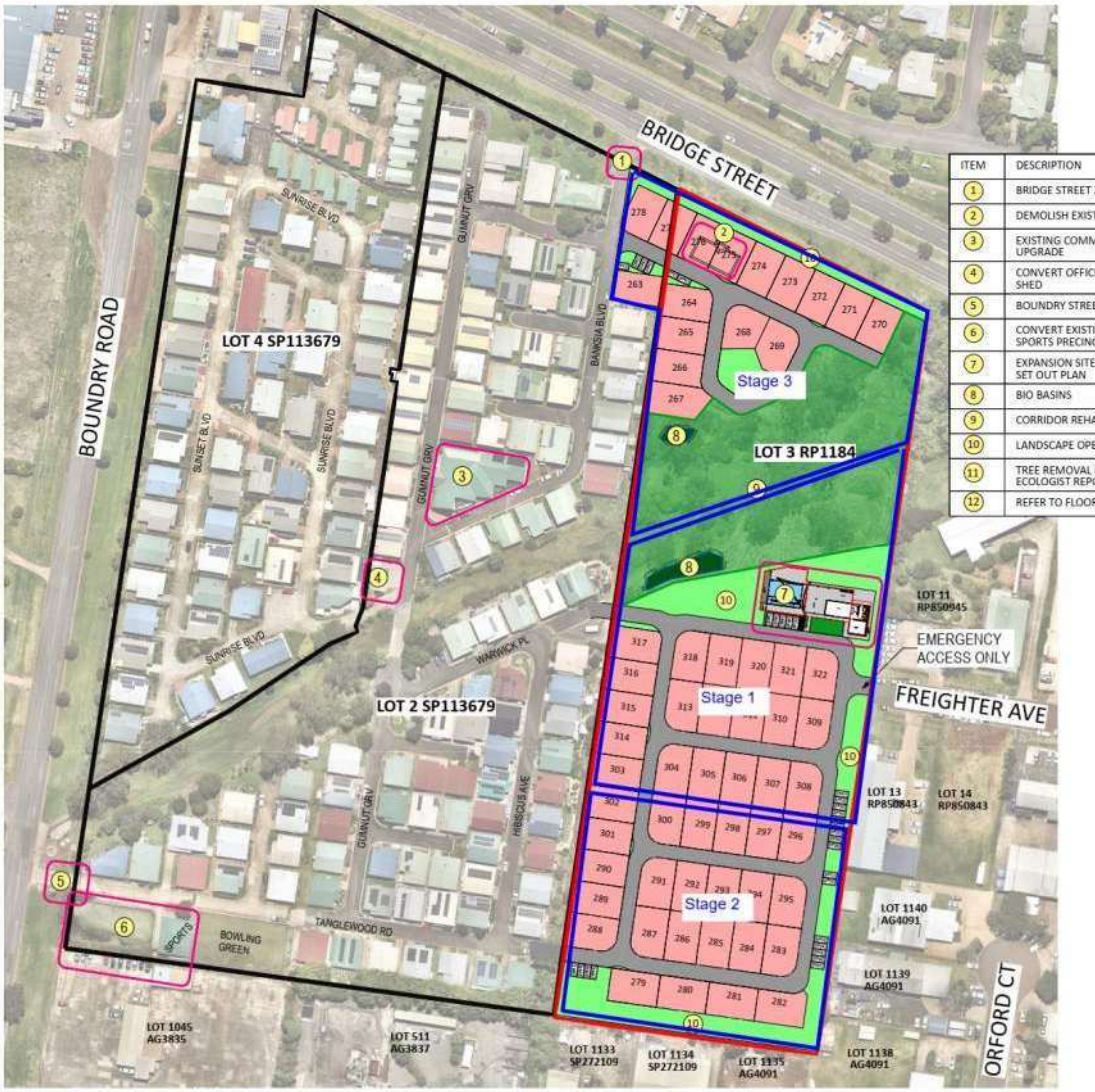
ADDRESS
530 BRIDGE STREET, WILSONTON, QLD 4350

DRAWING TITLE
EXISTING OVERALL MASTER PLAN

NOTES

DRAFT ISSUE

JOB NO. | SCALE 1:1500@A3
DRAWN HTA | DRAWING NO. DA.01 | ISSUE A



ITEM	DESCRIPTION	DRAWING NO.
1	BRIDGE STREET 2 - WAY ENTRY UPGRADE	C310 ISSUE A
2	DEMOLISH EXISTING DWELLING	DA.03 ISSUE A
3	EXISTING COMMUNITY BUILDING UPGRADE	DA.06 ISSUE A
4	CONVERT OFFICE TO MULTI PURPOSE SHED	DA.17 ISSUE A
5	BOUNDRY STREET ENTRY UPGRADE	C311 ISSUE A
6	CONVERT EXISTING TENNIS COURT AND SPORTS PRECINCT	DA.12 ISSUE A
7	EXPANSION SITE COMMUNITY FACILITIES SET OUT PLAN	DA.07 ISSUE A
8	BIO BASINS	C450 ISSUE A
9	CORRIDOR REHABILITATION	
10	LANDSCAPE OPEN SPACE	
11	TREE REMOVAL REFER TO ECOLOGIST REPORT	
12	REFER TO FLOOR REPORT	

N

HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

- EXISTING SITE BOUNDARY (REFER DRAWING NO. DA01 FOR DETAIL INFORMATION)
- EXPANSION SITE BOUNDARY
- PROPOSED SITES
- PROPOSED ROAD AND PARKING SPACES
- CORRIDOR REHABILITATION
- LANDSCAPE OPEN SPACE

EXISTING SITES	185
PROPOSED SITES	60
PROPOSED TOTAL NO.OF SITES	**245**
EXISTING VISITOR CARPARKING SPACES TO BE RETAINED	43
PROPOSED VISITOR CARPARKING SPACES	31
PROPOSED TOTAL NO.OF SITES (INCLUDING. 2 DISABLED)	**74**

BRIDGE STREET WILSONTON

PROJECT
BRIDGE STREET

ADDRESS
530 BRIDGE STREET, WILSONTON, QLD 4350

DRAWING TITLE
PROPOSED OVERALL MASTER PLAN

NOTES

ISSUE	DATE	REVISION
A	31/05/2023	PRELIMINARY ISSUE

DATE 05/2023 | JOB NO. | SCALE 1:1500@A3
DRAWN HTA | DRAWING NO. DA.02 | ISSUE A

HOMETOWN AUSTRALIA
COMMUNITIES

LEGEND

EXPANSION SITE BOUNDARY

1 EXISTING DWELLING ON LOT 3 RP1184

BRIDGE STREET
WILSONTON

PROJECT
BRIDGE STREET

ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

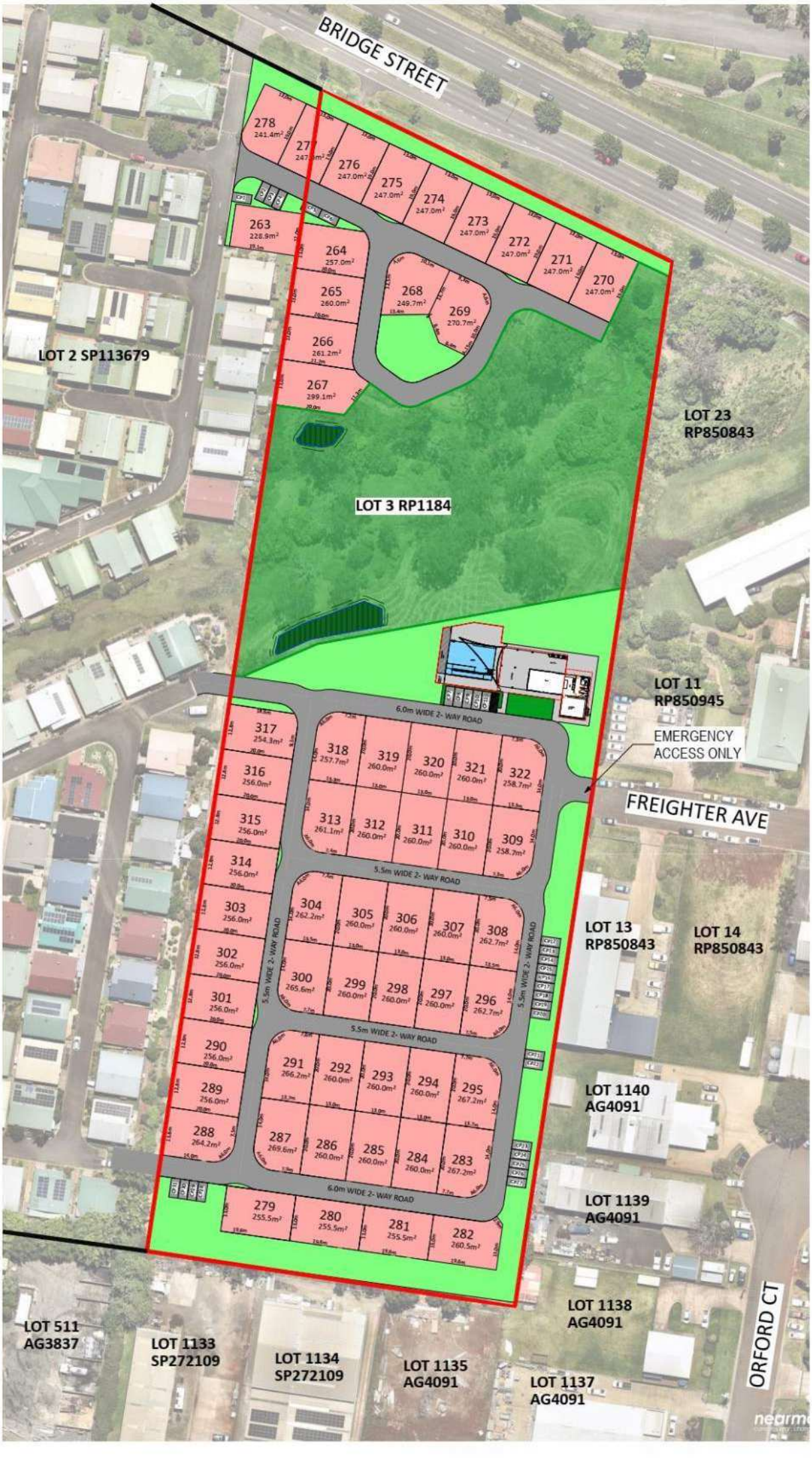
DRAWING TITLE
EXISTING EXPANSION SITE PLAN

NOTES

DRAFT ISSUE

DRAWN	DRAWING NO.	ISSUE
	DA.03	

JOB NO. SCALE



HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

- EXISTING SITE BOUNDARY
- EXPANSION SITE BOUNDARY
- PROPOSED SITES
- PROPOSED ROAD AND PARKING SPACES
- CORRIDOR REHABILITATION
- LANDSCAPE OPEN SPACE

BRIDGE STREET
WILSONTON

PROJECT
BRIDGE STREET

ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

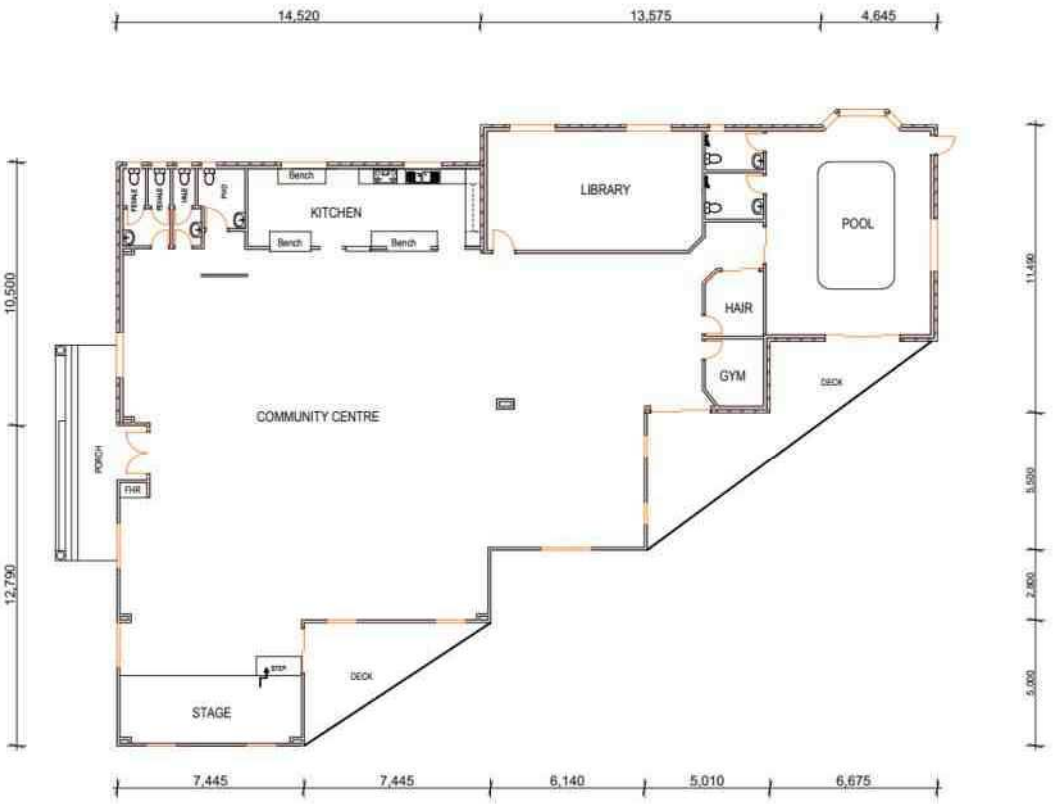
DRAWING TITLE
PROPOSED
EXPANSION SITE PLAN

NOTES

DRAFT ISSUE

JOB NO. SCALE

DRAWN DRAWING NO. ISSUE
DA.04



HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

BRIDGE STREET WILSONTON

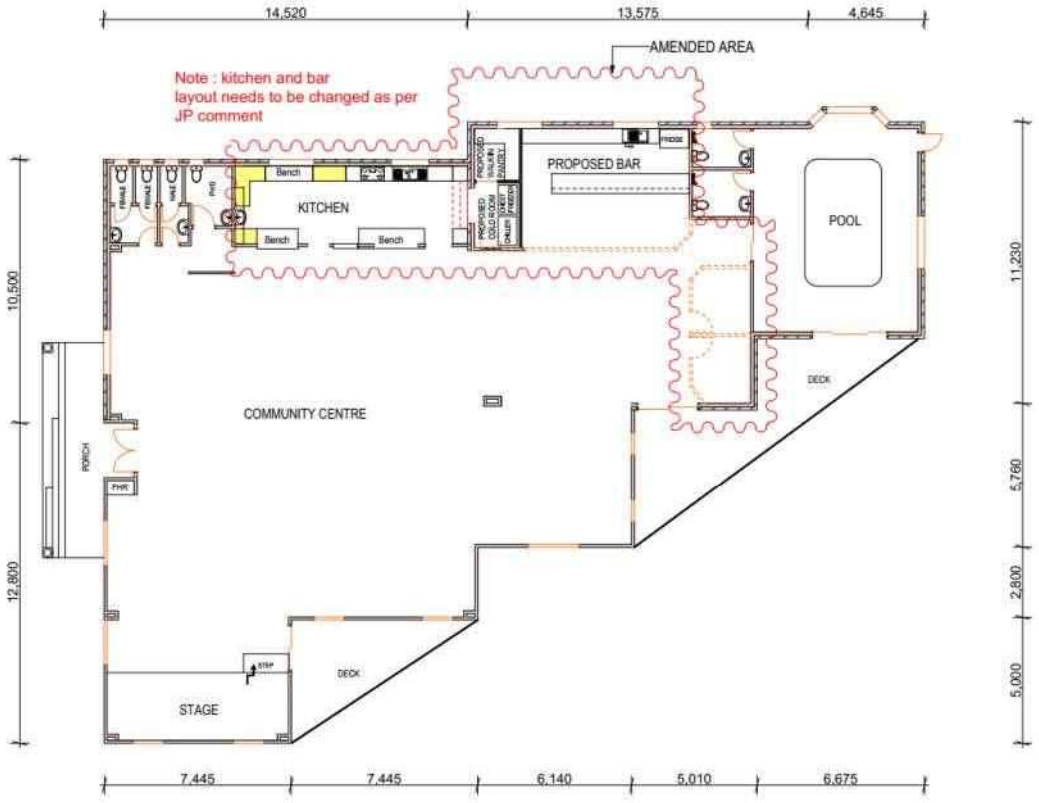
PROJECT
BRIDGE STREET
ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

DRAWING TITLE
EXISTING COMMUNITY BUILDING FLOOR PLAN

NOTES

DRAFT ISSUE

JOB NO. SCALE
DRAWN DRAWING NO. ISSUE
DA.05



HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

- EXISTING WALL NEEDS TO BE DEMOLISH
- PROPOSED 90mm WALL
- EXTENDED KITCHEN BENCH AREA
- EXISTING CABINTRY NEEDS TO BE REMOVED

BRIDGE STREET WILSONTON

PROJECT
BRIDGE STREET
ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

DRAWING TITLE
ALTERATION TO EXISTING COMMUNITY BUILDING FLOOR PLAN

NOTES
EXISTING LIBRARY CONVERTED TO PROPOSED BAR/ KITCHEN STORAGE
EXTERNAL ELEVATION TO BE RETAIN AS IT IS

DRAFT ISSUE

JOB NO. SCALE
DRAWN DRAWING NO. ISSUE
DA.06

HOMETOWN AUSTRALIA
COMMUNITIES

LEGEND

- PROPOSED ROAD AND PARKING SPACES
- CORRIDOR REHABILITATION
- LANDSCAPE OPEN SPACE
- PROPOSED SITES

BRIDGE STREET
WILSONTON

PROJECT
BRIDGE STREET

ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

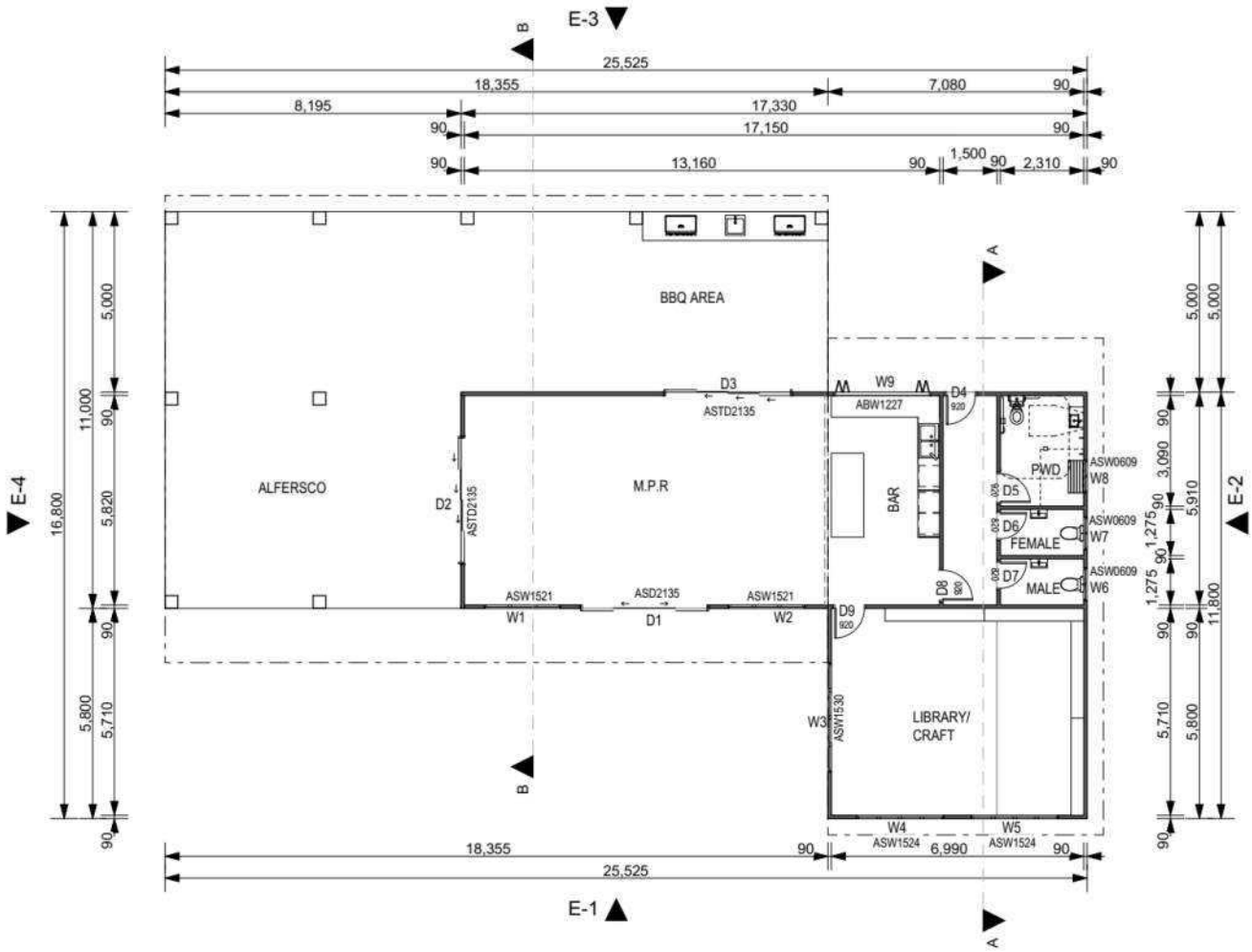
DRAWING TITLE
EXPANSION SITE - PROPOSED COMMUNITY FACILITIES SET OUT PLAN

NOTES

DRAFT ISSUE

JOB NO. SCALE

DRAWN DRAWING NO. ISSUE
DA.07



HOMETOWN AUSTRALIA
COMMUNITIES

LEGEND

ABW - ALUMINIUM BI-FOLD WINDOW
ASW- ALUMINIUM SLIDING GLASS WINDOW
ASD - ALUMINIUM SLIDING GLASS DOOR
ASTD - ALUMINIUM STACKER GLASS DOOR

BRIDGE STREET
WILSONTON

PROJECT
BRIDGE STREET

ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

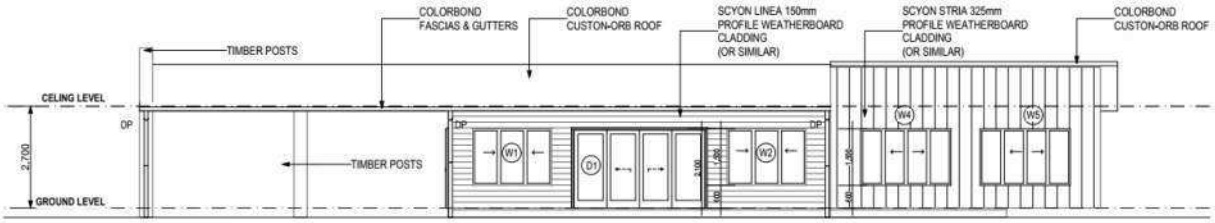
DRAWING TITLE
EXPANSION SITE - PROPOSED COMMUNITY BUILDING FLOOR PLAN

NOTES

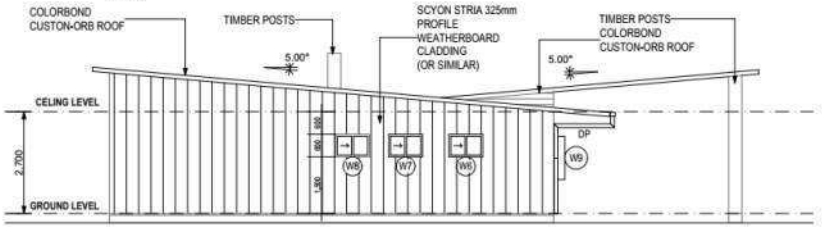
DRAFT ISSUE

JOB NO. SCALE
1:100@A3

DRAWN DRAWING NO. ISSUE
HTA DA.08 A



E-1 SD01 ELEVATION 1:100



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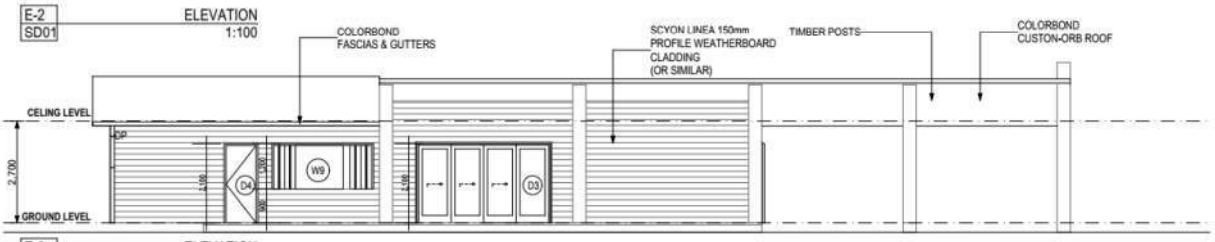

E-3 SD01 ELEVATION 1:100

E-4 SD01 ELEVATION 1:100

HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

BRIDGE STREET WILSONTON

PROJECT
BRIDGE STREET
ADDRESS
530 BRIDGE STREET, WILSONTON, QLD 4350

DRAWING TITLE
EXPANSION SITE - PROPOSED COMMUNITY BUILDING ELEVATIONS

NOTES

DRAFT ISSUE

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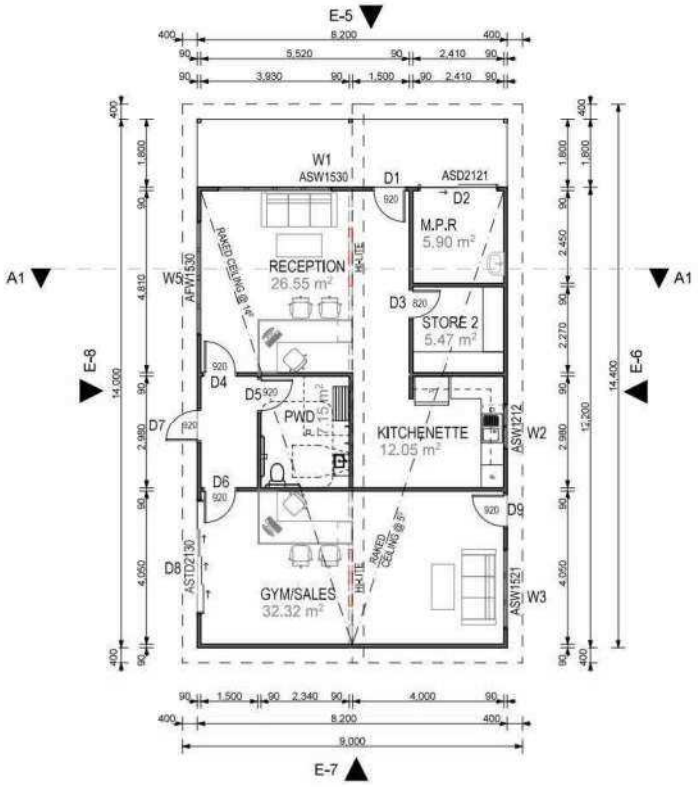
DRAWN HTA DRAWING NO. DA.10 ISSUE A



HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

AFW- ALUMINIUM FIXED GLASS WINDOW
ASW- ALUMINIUM SLIDING GLASS WINDOW
ASD - ALUMINIUM SLIDING GLASS DOOR
ASTD - ALUMINIUM STACKER GLASS DOOR
HI-LITE - HIGH LITE WONDOW

BRIDGE STREET WILSONTON

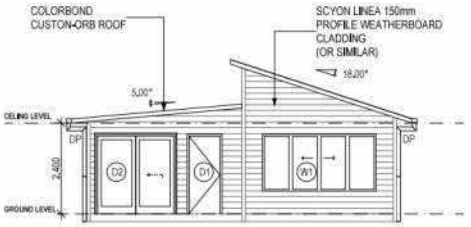
PROJECT
BRIDGE STREET
ADDRESS
530 BRIDGE STREET, WILSONTON, QLD 4350

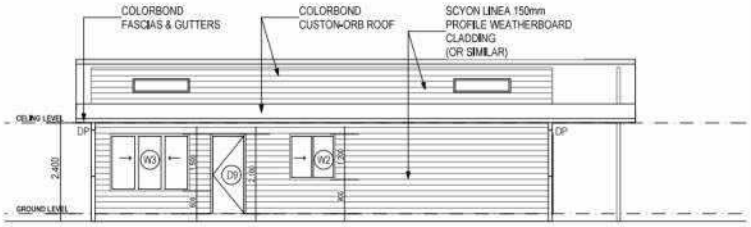
DRAWING TITLE
PROPOSED MANAGER OFFICE/GYM FLOOR PLAN

NOTES

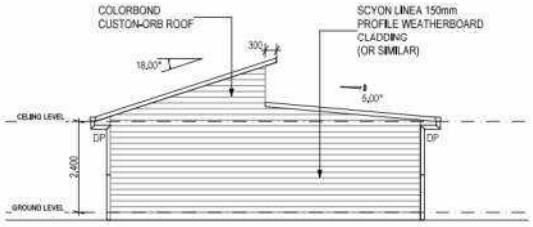
ISSUE	DATE	REVISION
A	22/06/2023	DA SUBMISSION ISSUE

DATE 06/2023 JOB NO. SCALE 1:100@A3
DRAWN HTA DRAWING NO. DA.14 ISSUE A





E-6 (2) SD05 — ELEVATION 1:100



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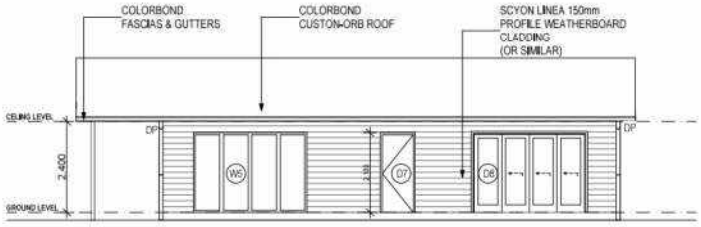


E-8 (2) SD05 — ELEVATION 1:100

HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

BRIDGE STREET WILSONTON

PROJECT
BRIDGE STREET
ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

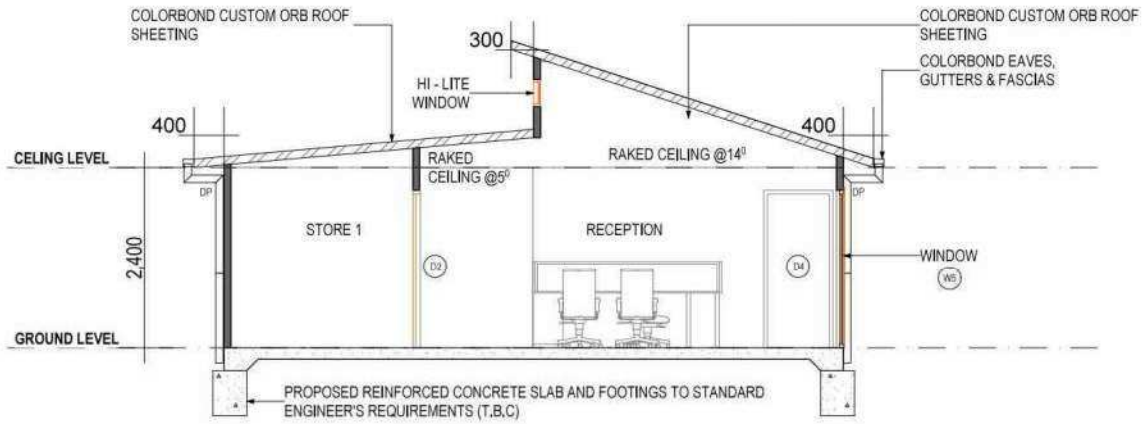
DRAWING TITLE
PROPOSED MANAGER OFFICE/GYM ELEVATIONS

NOTES

ISSUE	DATE	REVISION
A	22/06/2023	DA SUBMISSION ISSUE

DATE	JOB NO.	SCALE
06/2023		1:100@A3

DRAWN	DRAWING NO.	ISSUE
HTA	DA.15	A



A1 (1) SD05 — SECTION 1:50

HOMETOWN AUSTRALIA COMMUNITIES

LEGEND

BRIDGE STREET WILSONTON

PROJECT
BRIDGE STREET
ADDRESS
530 BRIDGE STREET,
WILSONTON, QLD 4350

DRAWING TITLE
PROPOSED MANAGER OFFICE/GYM SECTION

NOTES

ISSUE	DATE	REVISION
A	22/06/2023	DA SUBMISSION ISSUE

DATE	JOB NO.	SCALE
06/2023		1:50@A3

DRAWN	DRAWING NO.	ISSUE
HTA	DA.16	A

Vanity type:
1. 750mm wide
2. 900mm wide
3. 1200mm wide

Typical appliance space clearance dimensions:
Refrigerator - 1800mm high x 900mm wide
Washing machine - 600mm wide
Microwave oven - 500mm wide x 400mm high
Dishwasher - 450mm wide

AREAS	
House & garage:	150.4sq.m.
Rear terrace:	13.1 sq.m.
Front porch	0.9 sq.m.
-	-
Total:	164.4sq.m.
Total covered area:	167.1 sq.m.

WINDOW & DOOR LEGEND

MR	MIRROR
AW	ALUMINIUM FRAMED GLASS AWNING WINDOW
SL	ALUMINIUM FRAMED SLIDING GLASS WINDOW/ DOOR
PCAL	POWDERCOATED ALUMINIUM
CL	CLEAR GLAZING
TR	WHITE TRANSLUCENT GLAZING
TIM	PAINTED TIMBER
SC	SOLID CORE
HC	HOLLOW CORE
SHC	CAVITY TIMBER SLIDING HOLLOW CORE
GD	PANEL LIFT GARAGE DOOR
SR	SLIDING ROBE DOOR
FG	FIXED GLASS
VS	VINYL SLIDER

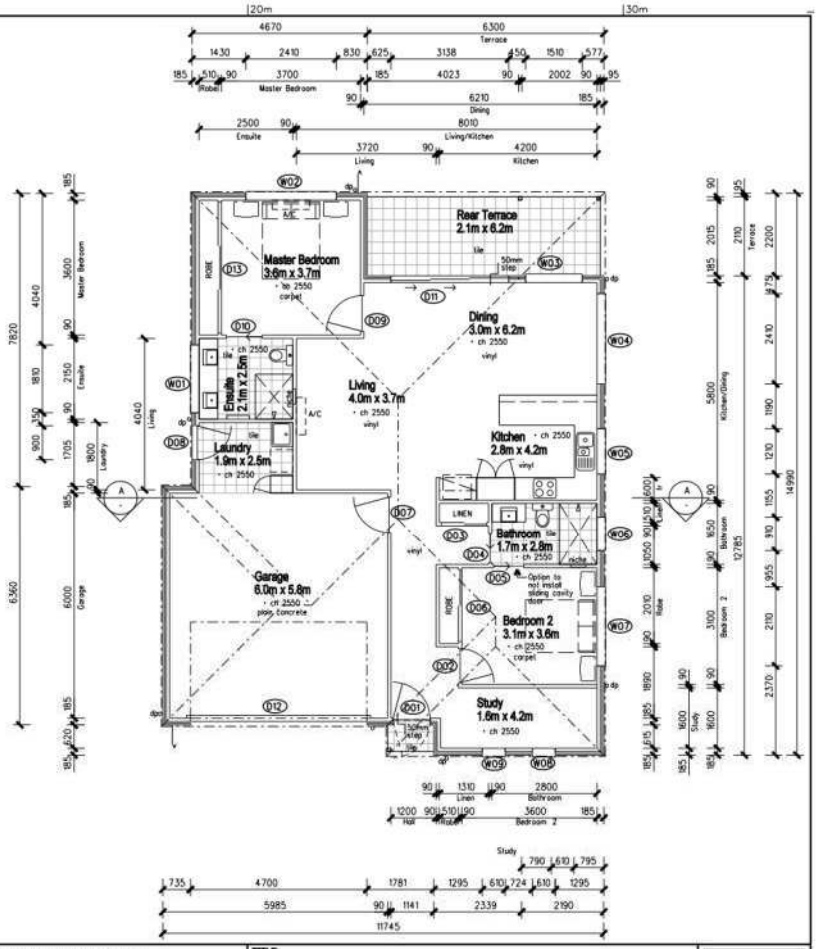
* NOTE: REFER ELEVATIONS AND SECTIONS FOR INDICATIVE DOOR/ WINDOW CONFIGURATIONS *
** NOTE: ALL EXTERNAL DOORS TO HAVE SETDOWN FOR THRESHOLDS (25mm REBATE IN SLAB) **

WINDOW SCHEDULE

MARK	LOCATION	WINDOW DIMENSIONS (H x W)	WINDOW TYPE	FRAME FINISH	GLAZING FINISH	NOTES
W01	ENSUITE	250 X 1810	FG	PCAL	TR	-
W02	MASTER BEDROOM	600 X 2410	AW	PCAL	CL	LOCKABLE
W03	DINING	600 X 1510	AW	PCAL	CL	LOCKABLE
W04	DINING	600 X 2410	AW	PCAL	CL	LOCKABLE
W05	KITCHEN	1200 X 1210	AW/FG	PCAL	CL	LOCKABLE
W06	BATHROOM	450 X 910	SL	PCAL	TR	LOCKABLE
W07	BED 2	600 X 2110	AW	PCAL	CL	LOCKABLE
W08	STUDY	1800 X 610	AW/ FG	PCAL	CL	LOCKABLE
W09	STUDY	1800 X 610	AW/ FG	PCAL	CL	LOCKABLE

DOOR SCHEDULE

MARK	LOCATION	DOOR DIMENSIONS (H x W)	DOOR TYPE	FRAME FINISH	DOOR FINISH	GLAZING FINISH	NOTES	LOCKSET
D01	ENTRY	2085 X 920	SC	TIM	TIM	CL	XNL SECURITY SCREEN	ENTRY LEVER SET
D02	BED 2	2040 X 820	HC	TIM	TIM	-	-	PRIVACY LOCK SET
D03	LINEN	2040 X 2/650	VS	PCAL	VINYL	-	MEASURE ON SITE	N/A
D04	BATHROOM	2040 X 720	SHC	TIM	TIM	-	-	RECESSED PULLS (PRIVACY)
D05	BATHROOM	2040 X 720	SHC	TIM	TIM	-	-	RECESSED PULLS (PRIVACY)
D06	ROBE	2040 X 2/870	SR	PCAL	MIR	-	MEASURE ON SITE	N/A
D07	GARAGE	2040 X 870	HC	TIM	TIM	-	-	PASSAGE LEVER SET
D08	LAUNDRY	2040 X 820	SC	TIM	TIM	-	SECURITY SCREEN	ENTRY LEVER SET
D09	MASTER BEDROOM	2040 X 870	HC	TIM	TIM	-	-	PRIVACY LOCK SET
D10	ENSUITE	2040 X 870	SHC	TIM	TIM	-	-	RECESSED PULLS (PRIVACY)
D11	DINING	2125 X 3138	SL	PCAL	-	CL	SECURITY SCREEN	STANDARD HANDLE LOCKING
D12	GARAGE	2125 X 4700	GD	TIM	PCAL	-		N/A
D13	MASTER BED ROBE	2040 X 3/1165	SR	PCAL	MIR	-	MEASURE ON SITE	N/A



VERIFY ALL DIMENSIONS, LEVELS AND SETOUT ON SITE

NORTH

ASHCROFT ARCHITECTS
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29 Taylor Road, Sheldon QLD 4157
Ph. 3206 0239
Mob. 0412 600 413
Email: brad@ashcroftarchitects.com.au

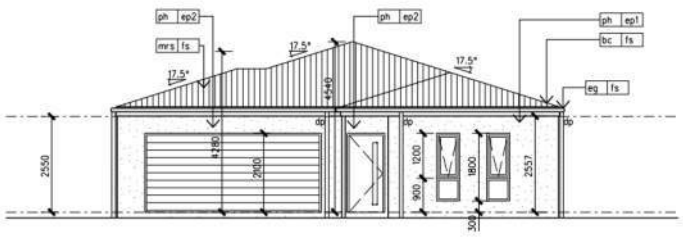
DALECK

CRIMSON MODIFIED
AT
530 BRIDGE STREET,
WILSONTON
FOR
DALECK QLD

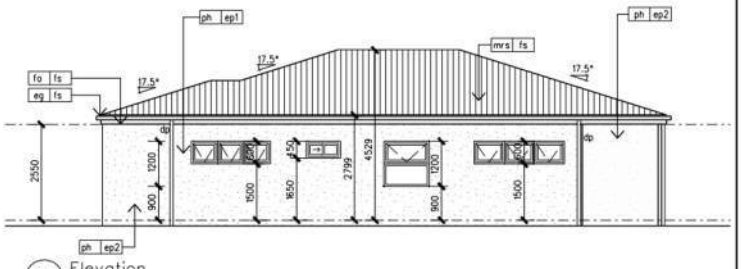
TITLE: FLOOR PLAN

DATE:	12.09.23	DRAWN:	B.R.A.	PROJECT No.:
SCALE:	1:100	ISSUE:	CLIENT REVIEW	Q19520

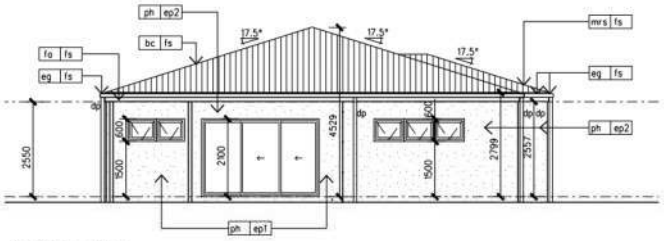
WD41 B



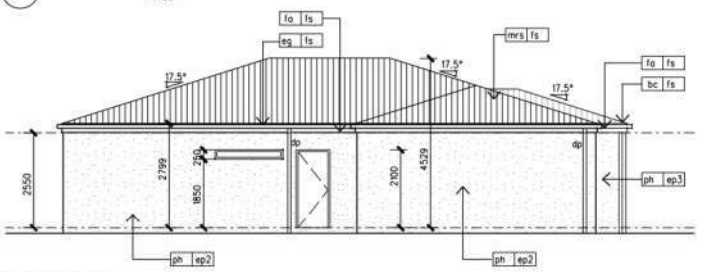
01 Elevation 1:100



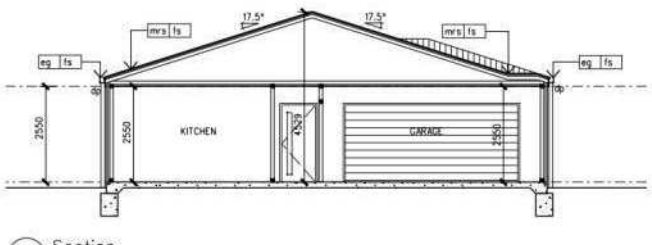
02 Elevation 1:100



03 Elevation 1:100



04 Elevation 1:100



A Section 1:100

External legend:

colour
finish

dp	down pipe
eg	eaves gutter
bc	barge capping
fa	colorbond fascia

Materials:

mrs	Colorbond metal roof sheet
ph	Painted hebel

Finishes (refer selected schedule):

ep1	external paint colour 1
ep2	external paint colour 2
ep3	external paint colour 3
fs	refer selected schedule for colour

VERIFY ALL DIMENSIONS, LEVELS AND SETOUT ON SITE

NORTH

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DALECK

CRIMSON MODIFIED
AT
530 BRIDGE STREET,
WILSONTON
FOR
DALECK QLD

TITLE: ELEVATIONS

DATE:	12.09.23	DRAWN:	B.R.A.	PROJECT No.:
SCALE:	1:100	ISSUE:	CLIENT REVIEW	Q19520

WD43 B

Vanity type:
1. 750mm wide
2. 900mm wide
3. 1200mm wide

Typical appliance space clearance dimensions:
Refrigerator - 1800mm high x 900mm wide
Washing machine - 600mm wide
Microwave oven - 500mm wide x 400mm high
Dishwasher - 450mm wide

AREAS	
House & garage:	154.2 sq.m.
Rear terrace:	8.9 sq.m.
Front porch:	2.1 sq.m.
Total:	165.2 sq.m.
Total covered area:	167.8 sq.m.

WINDOW & DOOR LEGEND

MR	MIRROR
AW	ALUMINIUM FRAMED GLASS AWNING WINDOW
SL	ALUMINIUM FRAMED SLIDING GLASS WINDOW/ DOOR
PCAL	POWDERCOATED ALUMINIUM
CL	CLEAR GLAZING
TR	WHITE TRANSLUCENT GLAZING
TIM	PAINTED TIMBER
SC	SOLID CORE
HC	HOLLOW CORE
SHC	CAVITY TIMBER SLIDING HOLLOW CORE
GD	PANEL LIFT GARAGE DOOR
SR	SLIDING ROBE DOOR
FG	FIXED GLASS
VS	VINYL SLIDER

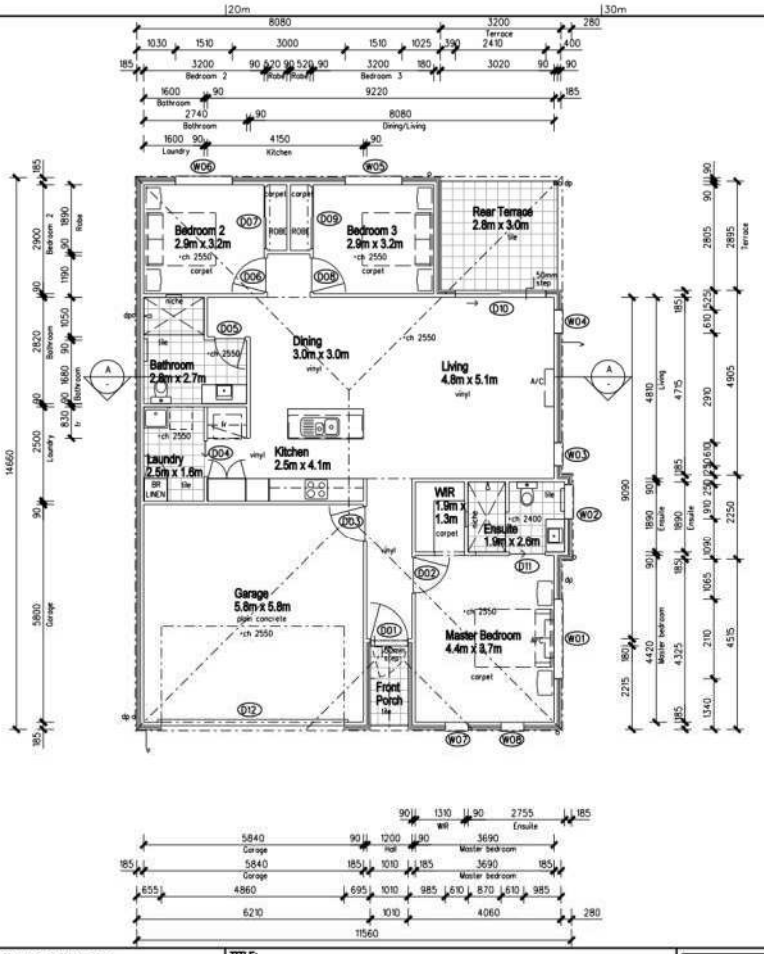
** NOTE: REFER ELEVATIONS AND SECTIONS FOR INDICATIVE DOOR/ WINDOW CONFIGURATIONS **
** NOTE: ALL EXTERNAL DOORS TO HAVE SETDOWN FOR THRESHOLDS (25mm REBATE IN SLAB) **

WINDOW SCHEDULE

MARK	LOCATION	WINDOW DIMENSIONS (H x W)	WINDOW TYPE	FRAME FINISH	GLAZING FINISH	NOTES
W01	MASTER BED	450 X 2110	AW	PCAL	CL	LOCKABLE
W02	ENSUITE	450 X 910	SL	PCAL	TR	LOCKABLE
W03	LIVING	1800 X 610	AW/FG	PCAL	CL	LOCKABLE
W04	LIVING	1800 X 610	AW/FG	PCAL	CL	LOCKABLE
W05	BED 3	1500 X 1510	SL	PCAL	CL	LOCKABLE
W06	BED 2	1500 X 1510	SL	PCAL	CL	LOCKABLE
W07	MASTER BED	1800 X 610	AW/FG	PCAL	CL	LOCKABLE
W08	MASTER BED	1800 X 610	AW/FG	PCAL	CL	LOCKABLE

DOOR SCHEDULE

MARK	LOCATION	DOOR DIMENSIONS (H x W)	DOOR TYPE	FRAME FINISH	DOOR FINISH	GLAZING FINISH	NOTES	LOCKSET
D01	ENTRY	2065 X 920	SC	TIM	TIM	CL	WM SECURITY SCREEN	ENTRY LEVER SET
D02	MASTER BEDROOM	2040 X 870	HC	TIM	TIM	-	-	PRIVACY LOCK SET
D03	GARAGE	2040 X 870	HC	TIM	TIM	-	-	PASSAGE LEVER SET
D04	LAUNDRY	2040 X 870	SHC	TIM	TIM	-	-	RECESSED PULLS
D05	BATHROOM	2040 X 820	HC	TIM	TIM	-	-	PRIVACY LOCK SET
D06	BED 2	2040 X 820	HC	TIM	TIM	-	-	PRIVACY LOCK SET
D07	BED 2 (ROBE)	2040 X 2/835	SR	PCAL	MR	-	MEASURE ON SITE	N/A
D08	BED 3	2040 X 820	HC	TIM	TIM	-	-	PRIVACY LOCK SET
D09	BED 2 (ROBE)	2040 X 2/835	SR	PCAL	MR	-	SECURITY SCREEN	STANDARD HANDLE LOCKING
D10	LIVING	2125 X 2410	SL	PCAL	-	CL	-	RECESSED PULLS (PRIVACY)
D11	ENSUITE	2040 X 870	SHC	TIM	TIM	-	MEASURE ON SITE	N/A
D12	GARAGE	2125 X 4860	GD	TIM	PCAL	-	-	N/A



VERIFY ALL DIMENSIONS, LEVELS AND SETOUT ON SITE

NORTH

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DALECK

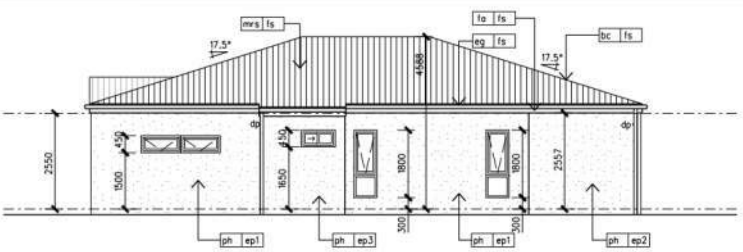
OAKLEY MODIFIED
AT
530 BRIDGE STREET,
WILSONTON
FOR
DALECK QLD

TITLE: FLOOR PLAN

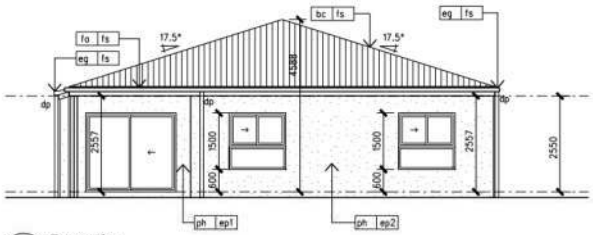
DATE:	12.09.23	DRAWN:	B.R.A.	PROJECT No.:
SCALE:	1:100	ISSUE:	CLIENT REVIEW	Q23694

WD91 B

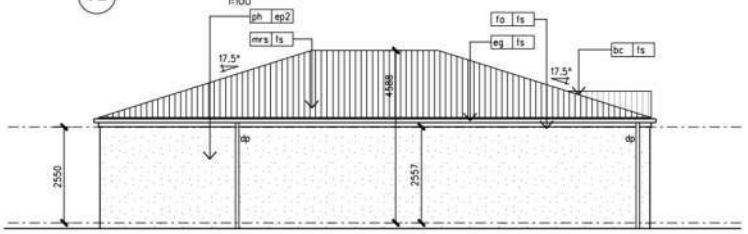
01 Elevation 1:100



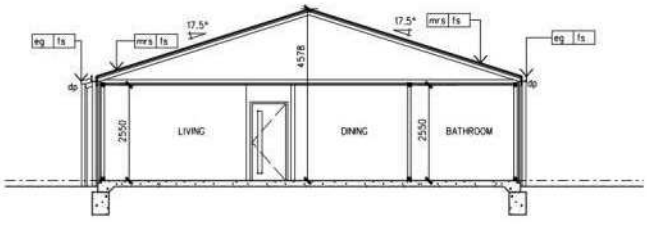
02 Elevation 1:100



03 Elevation 1:100



04 Elevation 1:100



A Section 1:100

External legend:

colour
finish

dp down pipe
eg eaves gutter
bc barge capping
fa colorbond fascia

Materials:
mrs Colorbond metal roof sheet
ph Painted hebel

Finishes (refer selected schedule):
ep1 external paint colour 1
ep2 external paint colour 2
ep3 external paint colour 3
fs refer selected schedule for colour

VERIFY ALL DIMENSIONS, LEVELS AND SETOUT ON SITE

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DALECK

OAKLEY MODIFIED
AT
530 BRIDGE STREET,
WILSONTON
FOR
DALECK QLD

TITLE: ELEVATIONS

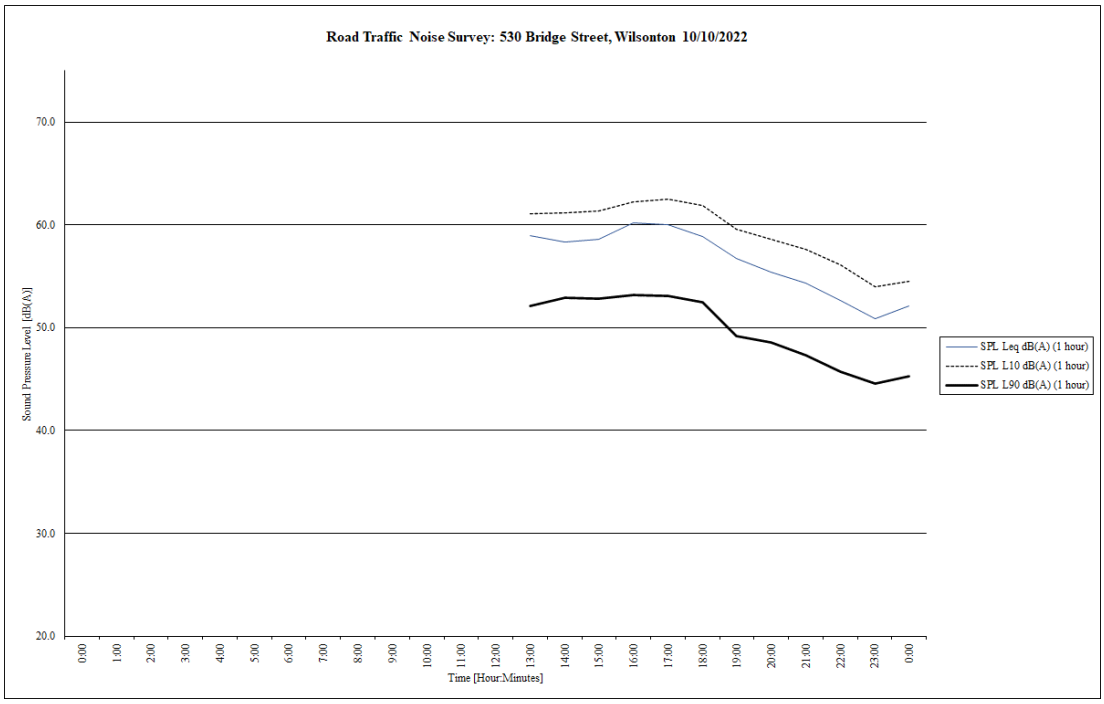
DATE:	12.09.23	DRAWN:	B.R.A.	PROJECT No.:
SCALE:	1:100	ISSUE:	CLIENT REVIEW	Q23694

WD93 B


ROAD 5
ROAD 6
ROAD 4
ROAD 1
ROAD 2
ROAD 3
ROAD 1
ROAD 1
SW
MS

APPENDIX C

Measurement Results and Model Calculations / Predictions


Road Traffic Noise Survey: 530 Bridge Street, Wilsonton 10/10/2022
Sound Pressure Level [dB(A)]
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40.0
30.0
20.0
0:00
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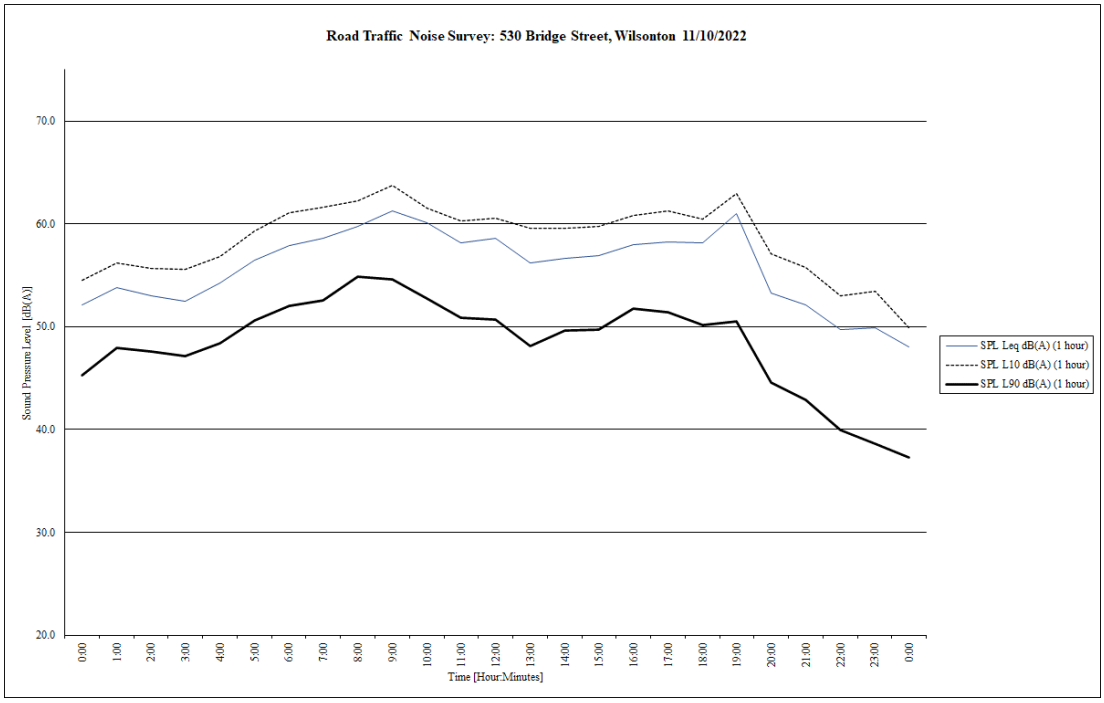
21:00
22:00
23:00
0:00
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)


Road Traffic Noise Survey: 530 Bridge Street, Wilsonton 11/10/2022
Sound Pressure Level [dB(A)]
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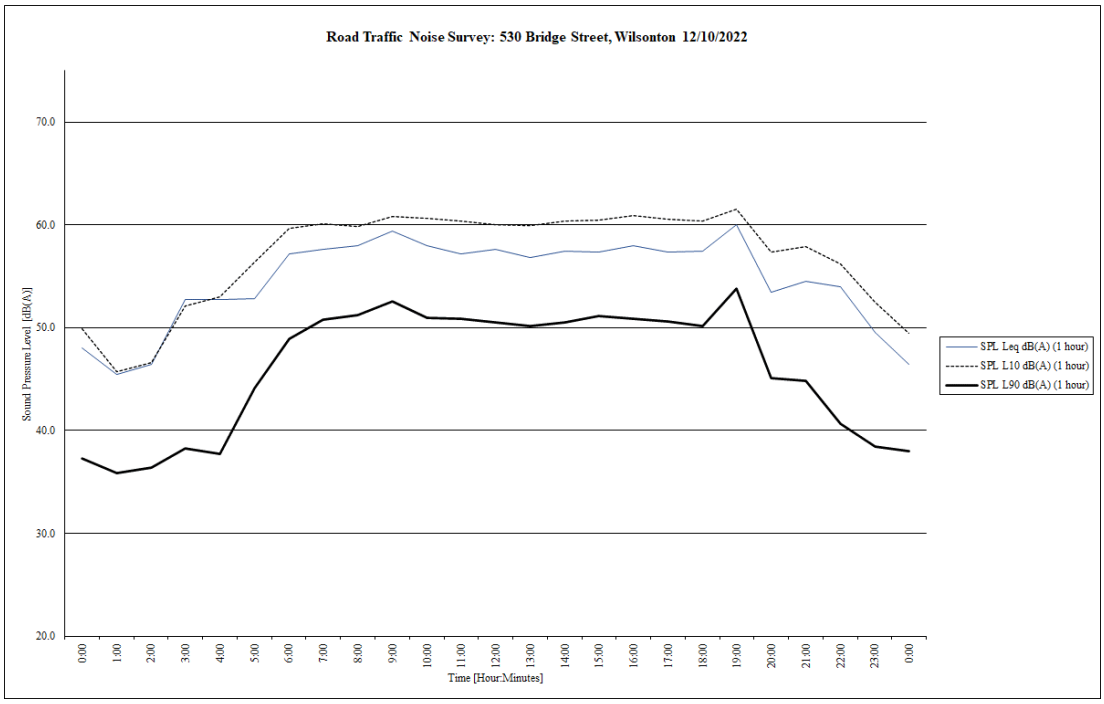
0:00
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)


Road Traffic Noise Survey: 530 Bridge Street, Wilsonton 12/10/2022
Sound Pressure Level [dB(A)]
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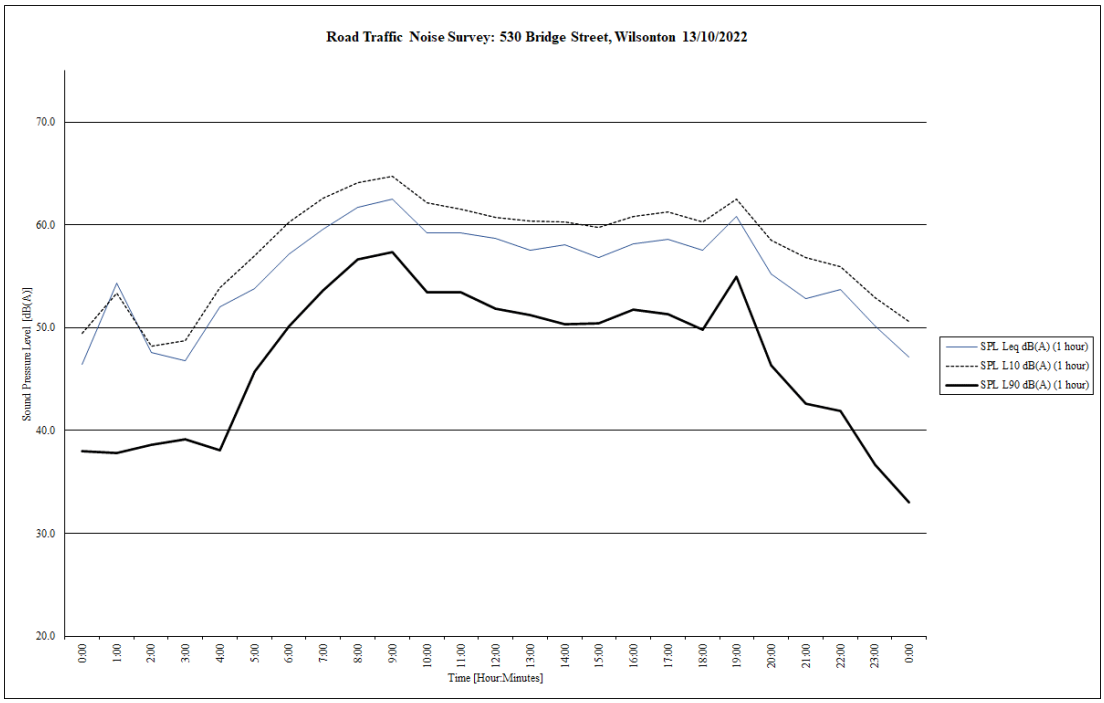
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)


Road Traffic Noise Survey: 530 Bridge Street, Wilsonton 13/10/2022
Sound Pressure Level [dB(A)]
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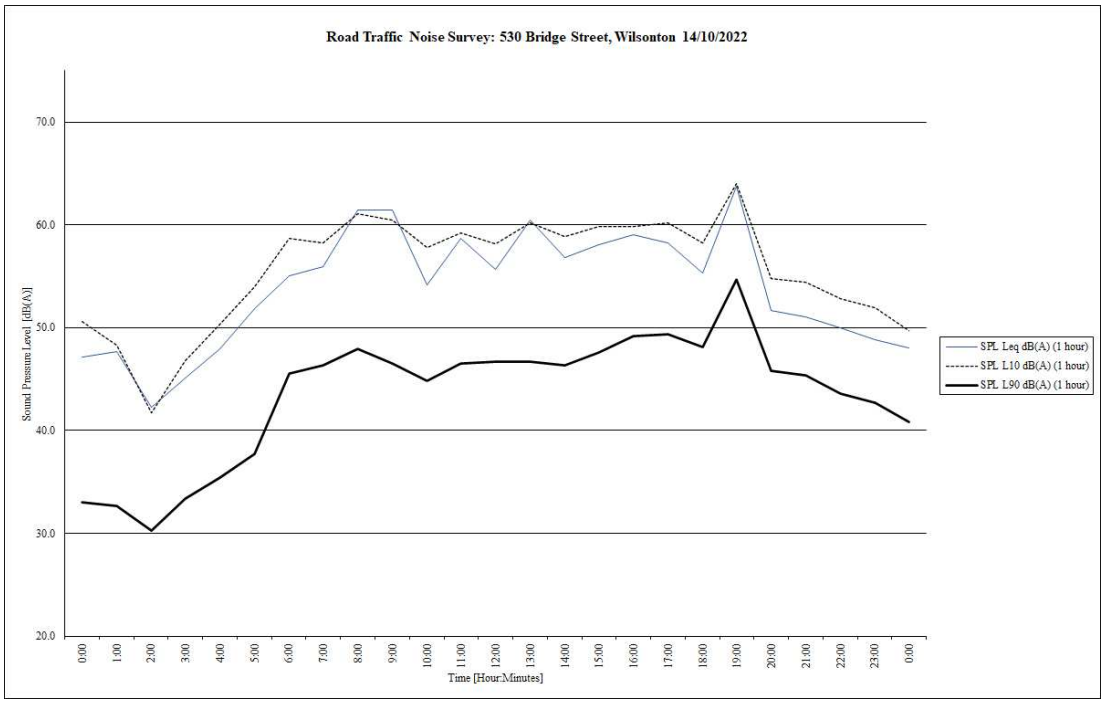
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)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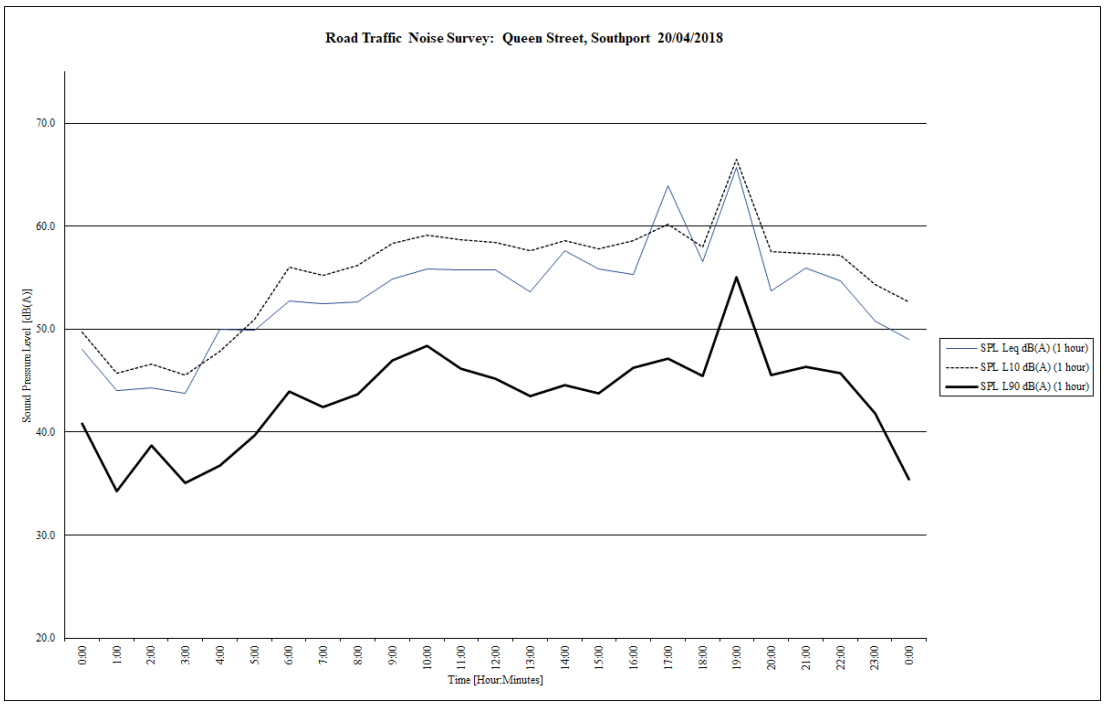
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)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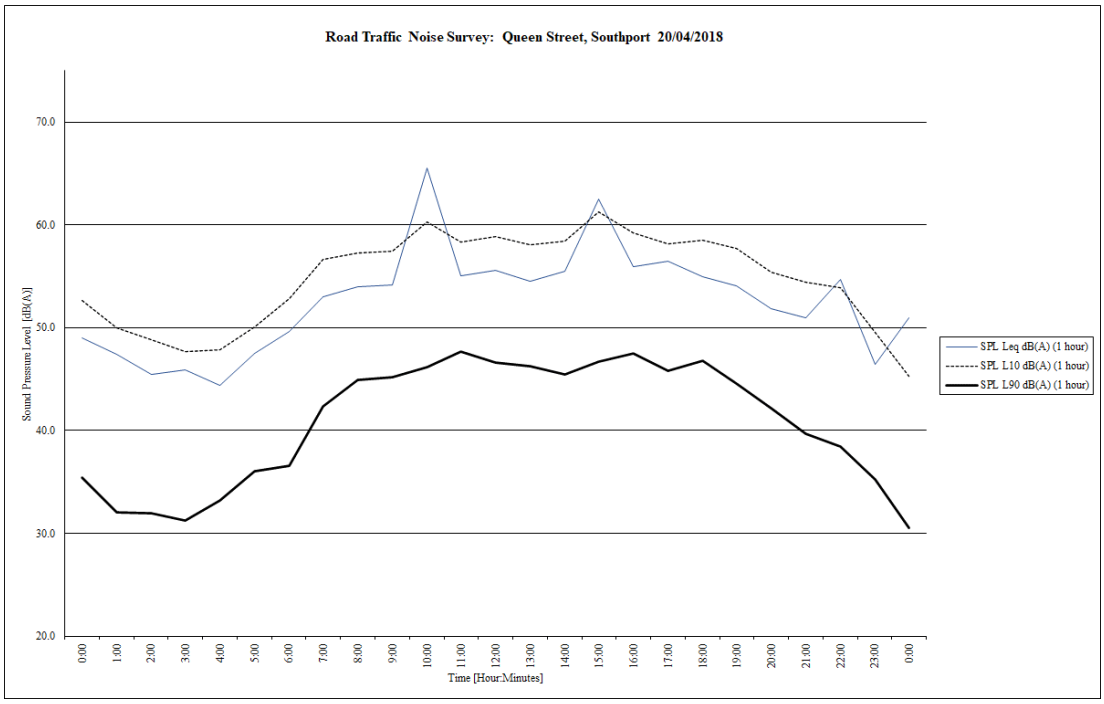
23:00
0:00
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)


Road Traffic Noise Survey: Queen Street, Southport 20/04/2018
Sound Pressure Level [dB(A)]
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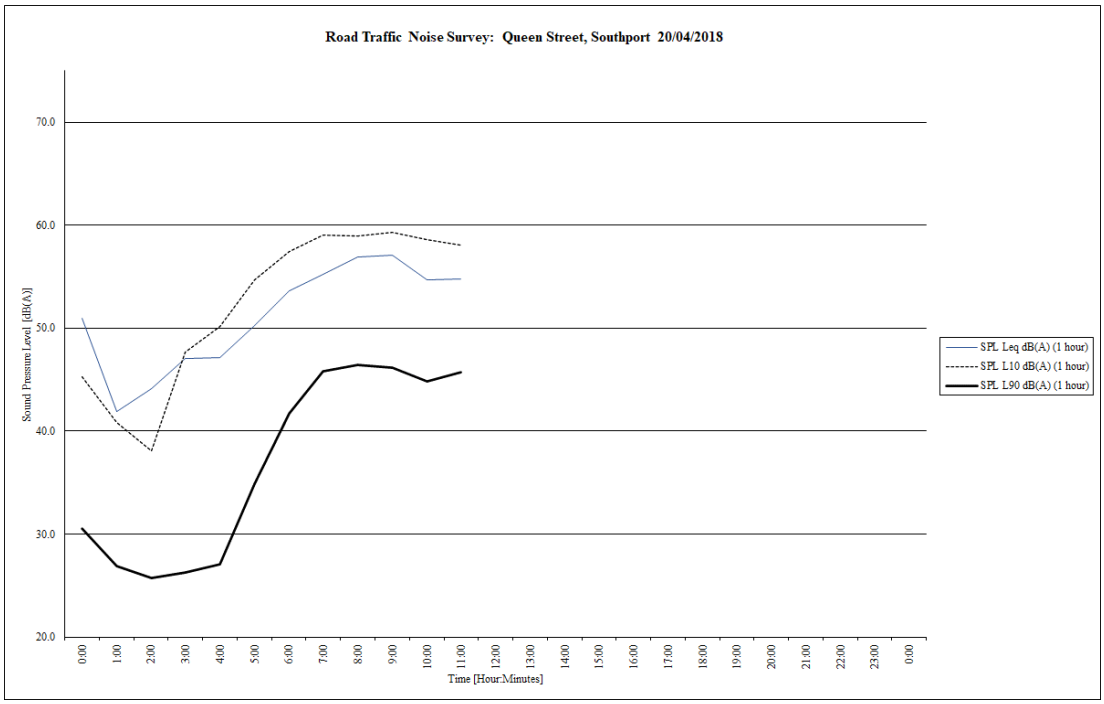
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)


Road Traffic Noise Survey: Queen Street, Southport 20/04/2018
Sound Pressure Level [dB(A)]
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21:00
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23:00
0:00
Time [Hour:Minutes]
SPL Leq dB(A) (1 hour)
SPL L10 dB(A) (1 hour)
SPL L90 dB(A) (1 hour)

MODEL VERIFICATION
POINT CALCULATIONS
Pen3D2000 V 1.10.0
Project Code:22143a
Project Description:Noise assessment of Bridge St Homes
File:\\Crgnas\2022\22143 Relocatable Home Park Wilsonton RTN AIR IND\22143a_existing.PEN

Friday 09 Jun, 2023 at 11:20:08
CoRTN Calculations
All road segments included. Segmentation angle: 5degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
monitor	392107.1	6953629.1	1.4	60.0 FREE-FIELD

ULTIMATE – NO BARRIER
File:C:\Users\Matty\Desktop\PEN3D 2023\22143a_ultimate just pos NO barr rev.1.PEN

File Description:Data file covering area

Tuesday 17 Oct, 2023 at 16:37:41
CoRTN Calculations
All road segments included. Segmentation angle: 5degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
263	392096.7	6953603.5	1.5	62.1
264	392111.2	6953599.1	1.5	62.7
265	392112.1	6953586.5	1.5	61.5
266	392110.3	6953573.2	1.5	59.4
267	392112.1	6953560.1	1.5	58.1
268	392135.4	6953588.3	1.5	63.2
269	392147.5	6953582.7	1.5	63.2
270	392188.4	6953592.5	1.5	65.1
271	392179.3	6953597.1	1.5	63
272	392167.6	6953602.8	1.5	62.3
273	392155.7	6953608.6	1.5	62.7
274	392144.2	6953614.1	1.5	63.2
275	392132	6953620.2	1.5	65.9
276	392120.9	6953625.6	1.5	65.3
277	392109	6953631.6	1.5	65.8
278	392097	6953637	1.5	66
279	392088.5	6953325.7	1.5	51.3
280	392109.6	6953323	1.5	51.5
281	392128.3	6953320	1.5	51.6
282	392147.8	6953317.2	1.5	51.7
283	392147.5	6953345.3	1.5	52.4
284	392135.1	6953347.5	1.5	52.4
285	392122.7	6953349.2	1.5	52.3
286	392109.4	6953351.1	1.5	52.2
287	392095.5	6953353.3	1.5	52.2
288	392077.6	6953349.3	1.5	51.9
289	392079.3	6953361.7	1.5	52.2
290	392081.3	6953374.4	1.5	52.7
291	392099	6953370.5	1.5	52.8
292	392110.2	6953369.1	1.5	52.8
293	392125.1	6953367.1	1.5	52.8
294	392137.5	6953365.1	1.5	53
295	392149.8	6953363.2	1.5	53
296	392154.5	6953390.3	1.5	54
297	392141.3	6953392.2	1.5	54
298	392129	6953394.1	1.5	53.9
299	392117.3	6953395.9	1.5	53.7
300	392104.6	6953397.8	1.5	53.7
301	392083.4	6953387.2	1.5	53
302	392084.9	6953399.9	1.5	53.4
303	392087.7	6953412.3	1.5	53.7
304	392105.4	6953415.3	1.5	54.1
305	392117.3	6953412.9	1.5	54.2
306	392131.7	6953411	1.5	54.3
307	392143.8	6953409.2	1.5	54.5
308	392156.8	6953407.4	1.5	54.7
309	392160.2	6953433.4	1.5	55.3
310	392148.3	6953437.3	1.5	55.3
311	392134.7	6953439.1	1.5	55.2
312	392121.3	6953441.2	1.5	55.1
313	392110.3	6953443.1	1.5	54.8
314	392089.7	6953425.3	1.5	54.1
315	392091.2	6953437.7	1.5	54.3
316	392093.2	6953450.4	1.5	54.4
317	392094.3	6953463.3	1.5	54.5
318	392113.6	6953460.6	1.5	55.1
319	392126.5	6953458.6	1.5	55.3
320	392139.1	6953456.7	1.5	55.6
321	392150.8	6953455.1	1.5	55.9
322	392163.3	6953453.3	1.5	55.9

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Tuesday 17 Oct, 2023 at 16:36:56
CoRTN Calculations
All road segments included. Segmentation angle: 5degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
263	392096.7	6953603.5	1.5	60.6
264	392111.2	6953599.1	1.5	61.2
265	392112.1	6953586.5	1.5	60
266	392110.3	6953573.2	1.5	57.9
267	392112.1	6953560.1	1.5	56.6
268	392135.4	6953588.3	1.5	61.7
269	392147.5	6953582.7	1.5	61.7
270	392188.4	6953592.5	1.5	63.6
271	392179.3	6953597.1	1.5	61.5
272	392167.6	6953602.8	1.5	60.8
273	392155.7	6953608.6	1.5	61.2
274	392144.2	6953614.1	1.5	61.7
275	392132	6953620.2	1.5	64.4
276	392120.9	6953625.6	1.5	63.8
277	392109	6953631.6	1.5	64.3
278	392097	6953637	1.5	64.5
279	392088.5	6953325.7	1.5	49.8
280	392109.6	6953323	1.5	50
281	392128.3	6953320	1.5	50.1
282	392147.8	6953317.2	1.5	50.2
283	392147.5	6953345.3	1.5	50.9
284	392135.1	6953347.5	1.5	50.9
285	392122.7	6953349.2	1.5	50.8
286	392109.4	6953351.1	1.5	50.7
287	392095.5	6953353.3	1.5	50.7
288	392077.6	6953349.3	1.5	50.4
289	392079.3	6953361.7	1.5	50.7
290	392081.3	6953374.4	1.5	51.2
291	392099	6953370.5	1.5	51.3
292	392110.2	6953369.1	1.5	51.3
293	392125.1	6953367.1	1.5	51.3
294	392137.5	6953365.1	1.5	51.5
295	392149.8	6953363.2	1.5	51.5
296	392154.5	6953390.3	1.5	52.5
297	392141.3	6953392.2	1.5	52.5
298	392129	6953394.1	1.5	52.4
299	392117.3	6953395.9	1.5	52.2
300	392104.6	6953397.8	1.5	52.2
301	392083.4	6953387.2	1.5	51.5
302	392084.9	6953399.9	1.5	51.9
303	392087.7	6953412.3	1.5	52.2
304	392105.4	6953415.3	1.5	52.6
305	392117.3	6953412.9	1.5	52.7
306	392131.7	6953411	1.5	52.8
307	392143.8	6953409.2	1.5	53
308	392156.8	6953407.4	1.5	53.2
309	392160.2	6953433.4	1.5	53.8
310	392148.3	6953437.3	1.5	53.8
311	392134.7	6953439.1	1.5	53.7
312	392121.3	6953441.2	1.5	53.6
313	392110.3	6953443.1	1.5	53.3
314	392089.7	6953425.3	1.5	52.6
315	392091.2	6953437.7	1.5	52.8
316	392093.2	6953450.4	1.5	52.9
317	392094.3	6953463.3	1.5	53
318	392113.6	6953460.6	1.5	53.6
319	392126.5	6953458.6	1.5	53.8
320	392139.1	6953456.7	1.5	54.1
321	392150.8	6953455.1	1.5	54.4
322	392163.3	6953453.3	1.5	54.4

ULTIMATE – WITH ACOUSTIC BARRIERS
File:C:\Users\Matty\Desktop\PEN3D 2023\22143a_ultimate just pos barr rev.1.PEN

Tuesday 17 Oct, 2023 at 16:32:11
CoRTN Calculations
All road segments included. Segmentation angle: 5degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
263	392096.7	6953603.5	1.5	59.2
264	392111.2	6953599.1	1.5	59.5
265	392112.1	6953586.5	1.5	59
266	392110.3	6953573.2	1.5	57.7
267	392112.1	6953560.1	1.5	56.8
268	392135.4	6953588.3	1.5	60.1
269	392147.5	6953582.7	1.5	60.2
270	392188.4	6953592.5	1.5	57.4
271	392179.3	6953597.1	1.5	56.6
272	392167.6	6953602.8	1.5	56.4
273	392155.7	6953608.6	1.5	57.2
274	392144.2	6953614.1	1.5	57.9
275	392132	6953620.2	1.5	58.5
276	392120.9	6953625.6	1.5	58.4
277	392109	6953631.6	1.5	58.4
278	392097	6953637	1.5	58.4
279	392088.5	6953325.7	1.5	51
280	392109.6	6953323	1.5	51.2
281	392128.3	6953320	1.5	51.4
282	392147.8	6953317.2	1.5	51.5
283	392147.5	6953345.3	1.5	52.1
284	392135.1	6953347.5	1.5	52.1
285	392122.7	6953349.2	1.5	52
286	392109.4	6953351.1	1.5	51.8
287	392095.5	6953353.3	1.5	51.7
288	392077.6	6953349.3	1.5	51.4
289	392079.3	6953361.7	1.5	51.8
290	392081.3	6953374.4	1.5	52.2
291	392099	6953370.5	1.5	52.3
292	392110.2	6953369.1	1.5	52.3
293	392125.1	6953367.1	1.5	52.4
294	392137.5	6953365.1	1.5	52.7
295	392149.8	6953363.2	1.5	52.7
296	392154.5	6953390.3	1.5	53.6
297	392141.3	6953392.2	1.5	53.5
298	392129	6953394.1	1.5	53.4
299	392117.3	6953395.9	1.5	53.2
300	392104.6	6953397.8	1.5	53.1
301	392083.4	6953387.2	1.5	52.5
302	392084.9	6953399.9	1.5	52.8
303	392087.7	6953412.3	1.5	53
304	392105.4	6953415.3	1.5	53.4
305	392117.3	6953412.9	1.5	53.5
306	392131.7	6953411	1.5	53.7
307	392143.8	6953409.2	1.5	54
308	392156.8	6953407.4	1.5	54.2
309	392160.2	6953433.4	1.5	54.6
310	392148.3	6953437.3	1.5	54.6
311	392134.7	6953439.1	1.5	54.4
312	392121.3	6953441.2	1.5	54.3
313	392110.3	6953443.1	1.5	53.9
314	392089.7	6953425.3	1.5	53.3
315	392091.2	6953437.7	1.5	53.4
316	392093.2	6953450.4	1.5	53.4
317	392094.3	6953463.3	1.5	53.4
318	392113.6	6953460.6	1.5	54
319	392126.5	6953458.6	1.5	54.3
320	392139.1	6953456.7	1.5	54.6
321	392150.8	6953455.1	1.5	55
322	392163.3	6953453.3	1.5	55.1

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Tuesday 17 Oct, 2023 at 16:30:43
CoRTN Calculations
All road segments included. Segmentation angle: 5degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
263	392096.7	6953603.5	1.5	57.7
264	392111.2	6953599.1	1.5	58
265	392112.1	6953586.5	1.5	57.5
266	392110.3	6953573.2	1.5	56.2
267	392112.1	6953560.1	1.5	55.3
268	392135.4	6953588.3	1.5	58.6
269	392147.5	6953582.7	1.5	58.7
270	392188.4	6953592.5	1.5	55.9
271	392179.3	6953597.1	1.5	55.1
272	392167.6	6953602.8	1.5	54.9
273	392155.7	6953608.6	1.5	55.7
274	392144.2	6953614.1	1.5	56.4
275	392132	6953620.2	1.5	57
276	392120.9	6953625.6	1.5	56.9
277	392109	6953631.6	1.5	56.9
278	392097	6953637	1.5	56.9
279	392088.5	6953325.7	1.5	49.5
280	392109.6	6953323	1.5	49.7
281	392128.3	6953320	1.5	49.9
282	392147.8	6953317.2	1.5	50
283	392147.5	6953345.3	1.5	50.6
284	392135.1	6953347.5	1.5	50.6
285	392122.7	6953349.2	1.5	50.5
286	392109.4	6953351.1	1.5	50.3
287	392095.5	6953353.3	1.5	50.2
288	392077.6	6953349.3	1.5	49.9
289	392079.3	6953361.7	1.5	50.3
290	392081.3	6953374.4	1.5	50.7
291	392099	6953370.5	1.5	50.8
292	392110.2	6953369.1	1.5	50.8
293	392125.1	6953367.1	1.5	50.9
294	392137.5	6953365.1	1.5	51.2
295	392149.8	6953363.2	1.5	51.2
296	392154.5	6953390.3	1.5	52.1
297	392141.3	6953392.2	1.5	52
298	392129	6953394.1	1.5	51.9
299	392117.3	6953395.9	1.5	51.7
300	392104.6	6953397.8	1.5	51.6
301	392083.4	6953387.2	1.5	51
302	392084.9	6953399.9	1.5	51.3
303	392087.7	6953412.3	1.5	51.5
304	392105.4	6953415.3	1.5	51.9
305	392117.3	6953412.9	1.5	52
306	392131.7	6953411	1.5	52.2
307	392143.8	6953409.2	1.5	52.5
308	392156.8	6953407.4	1.5	52.7
309	392160.2	6953433.4	1.5	53.1
310	392148.3	6953437.3	1.5	53.1
311	392134.7	6953439.1	1.5	52.9
312	392121.3	6953441.2	1.5	52.8
313	392110.3	6953443.1	1.5	52.4
314	392089.7	6953425.3	1.5	51.8
315	392091.2	6953437.7	1.5	51.9
316	392093.2	6953450.4	1.5	51.9
317	392094.3	6953463.3	1.5	51.9
318	392113.6	6953460.6	1.5	52.5
319	392126.5	6953458.6	1.5	52.8
320	392139.1	6953456.7	1.5	53.1
321	392150.8	6953455.1	1.5	53.5
322	392163.3	6953453.3	1.5	53.6

OFFSITE ACTIVITY NOISE PREDICTION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Nearest Southern Lots

CAR DOOR CLOSURES	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	75	77	80	dB(A)
Duration of single event		1.5		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	80	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		11.5		m
Distance attenuation (-6 dB per doubling of distance)		-21		dB
Acoustic barrier screening		-9.2		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**33**	**N/A**	**57**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**26**	**N/A**	**50**	**dB(A)**
	3957.706	N/A	57	

CAR ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	73	74	75	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	54	N/A	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		11.5		m
Distance attenuation (-6 dB per doubling of distance)		-21		dB
Acoustic barrier screening		-9.2		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**26**	**N/A**	**47**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**19**	**N/A**	**40**	**dB(A)**
	406.5758	N/A	47	

CAR MOVEMENTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	68	70	73	dB(A)
Duration of single event		15		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		225.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		-9.3		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**26**	**N/A**	**43**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**19**	**N/A**	**36**	**dB(A)**
	1421.2086	N/A	43	

TRUCK ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	78	81	83	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		12.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	53	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		11.5		m
Distance attenuation (-6 dB per doubling of distance)		-21		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**35**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**27**	**N/A**	**N/A**	**dB(A)**
	2828.024	N/A	N/A	

TRUCK MOVEMENT	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	87	89	90	dB(A)
Duration of single event		45		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		180.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	N/A	90	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**54**	**N/A**	**70**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**46**	**N/A**	**62**	**dB(A)**

Nearest Eastern Lots

CAR DOOR CLOSURES	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	75	77	80	dB(A)
Duration of single event		1.5		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	80	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**28**	**N/A**	**52**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**21**	**N/A**	**45**	**dB(A)**
	634.1608	N/A	52	

CAR ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	73	74	75	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	54	N/A	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**21**	**N/A**	**42**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**14**	**N/A**	**35**	**dB(A)**
	126.5317	N/A	42	

CAR MOVEMENTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	68	70	73	dB(A)
Duration of single event		15		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		225.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		-14.7		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**21**	**N/A**	**38**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**13**	**N/A**	**30**	**dB(A)**
	1142.5936	N/A	38	

TRUCK ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	78	81	83	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		12.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	53	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**33**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**25**	**N/A**	**N/A**	**dB(A)**
	1908.195	N/A	N/A	

TRUCK MOVEMENT	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	87	89	90	dB(A)
Duration of single event		45		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		180.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	N/A	90	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**54**	**N/A**	**70**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**46**	**N/A**	**62**	**dB(A)**

OFFSITE ACTIVITY NOISE PREDICTION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Nearest Southern Lots

TRUCK AIRBRAKES at driveway crossover	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		89		m
Distance attenuation (-6 dB per doubling of distance)		-39		dB
Acoustic barrier screening		-5.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**27**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**19**	**N/A**	**N/A**	**dB(A)**
1098.809	N/A	N/A		

TRUCK AIRBRAKES at building	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		15		m
Distance attenuation (-6 dB per doubling of distance)		-24		dB
Acoustic barrier screening		-7.8		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**40**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**32**	**N/A**	**N/A**	**dB(A)**
9307.741	N/A	N/A		

FORKLIFT MOVEMENTS OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	71	74	75	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	68	74	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-11		dB
Acoustic barrier screening		-7.8		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**52**	**58**	**59**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**44**	**50**	**51**	**dB(A)**
1531345	58	59		

FORKLIFT LOADING TRUCK	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	70	72	77	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	67	72	77	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-11		dB
Acoustic barrier screening		-7.8		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**51**	**56**	**61**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**43**	**48**	**53**	**dB(A)**
12103911	56	61		

FORKLIFT LOADING TRUCK WITH HORN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	72	75	92	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		9.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-11		dB
Acoustic barrier screening		-7.8		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**35**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**27**	**N/A**	**N/A**	**dB(A)**

Nearest Eastern Lots

TRUCK AIRBRAKES at driveway crossover	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		77		m
Distance attenuation (-6 dB per doubling of distance)		-38		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**21**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**13**	**N/A**	**N/A**	**dB(A)**
117.8559	N/A	N/A		

TRUCK AIRBRAKES at building	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**36**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**28**	**N/A**	**N/A**	**dB(A)**
3565.141	N/A	N/A		

FORKLIFT MOVEMENTS OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	71	74	75	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	68	74	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-11		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**47**	**53**	**54**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**40**	**46**	**47**	**dB(A)**
510950.09	53	54		

FORKLIFT LOADING TRUCK	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	70	72	77	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	67	72	77	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-11		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**46**	**51**	**56**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**39**	**44**	**49**	**dB(A)**
340580.21	51	56		

FORKLIFT LOADING TRUCK WITH HORN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	72	75	92	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		9.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-11		dB
Acoustic barrier screening		-12.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**30**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**23**	**N/A**	**N/A**	**dB(A)**

OFFSITE ACTIVITY NOISE PREDICTION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Nearest Southern Lots

PEOPLE TALKING OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	65	70	73	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	65	70	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		12		m
Distance attenuation (-6 dB per doubling of distance)		-22		dB
Acoustic barrier screening		-5.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**40**	**45**	**48**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**33**	**38**	**41**	**dB(A)**
	11020.56	45	48	

CYCLONE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	61	62	63	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	61	62	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		16		m
Distance attenuation (-6 dB per doubling of distance)		-15		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**54**	**55**	**56**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**46**	**47**	**48**	**dB(A)**
	248887.2	55	56	

NUT RUNNER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	52	61	63	dB(A)
Duration of single event		30		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		900.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	61	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		16		m
Distance attenuation (-6 dB per doubling of distance)		2		dB
Acoustic barrier screening		-5.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**50**	**65**	**67**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**42**	**57**	**59**	**dB(A)**
	98148.04	65	67	

DROPPING TIMBER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	53	56	58	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		60		Events
Total time duration of combined events		120.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	38	N/A	58	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		15		m
Distance attenuation (-6 dB per doubling of distance)		4		dB
Acoustic barrier screening		-5.5		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**45**	**N/A**	**64**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**37**	**N/A**	**57**	**dB(A)**
	29288.56	N/A	64	

FRONT END LOADER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	77	80	82	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	80	82	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		49		m
Distance attenuation (-6 dB per doubling of distance)		-18		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**58**	**64**	**66**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**51**	**57**	**59**	**dB(A)**

Nearest Eastern Lots

PEOPLE TALKING OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	65	70	73	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	65	70	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		-9.4		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**35**	**40**	**43**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**28**	**33**	**36**	**dB(A)**
	3282.46	40	43	

CYCLONE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	61	62	63	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	61	62	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		44		m
Distance attenuation (-6 dB per doubling of distance)		-23		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**45**	**46**	**47**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**38**	**39**	**40**	**dB(A)**
	32910.7	46	47	

NUT RUNNER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	52	61	63	dB(A)
Duration of single event		30		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		900.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	61	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		3		dB
Acoustic barrier screening		-9.4		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**47**	**62**	**64**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**40**	**55**	**57**	**dB(A)**
	52023.6	62	64	

DROPPING TIMBER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	53	56	58	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		60		Events
Total time duration of combined events		120.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	38	N/A	58	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		14		m
Distance attenuation (-6 dB per doubling of distance)		5		dB
Acoustic barrier screening		-9.4		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**41**	**N/A**	**61**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**34**	**N/A**	**54**	**dB(A)**
	13644.55	N/A	61	

FRONT END LOADER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	77	80	82	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	80	82	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		110		m
Distance attenuation (-6 dB per doubling of distance)		-25		dB
Acoustic barrier screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**51**	**57**	**59**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**44**	**50**	**52**	**dB(A)**

OFFSITE ACTIVITY NOISE PREDICTION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Nearest Southern Lots

WASTE COLLECTION INDUSTRIAL BIN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	92	97	102	dB(A)
Duration of single event	180			Seconds
Number of events in the measurement period	1			Events
Total time duration of combined events	180.0			Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	79	N/A	102	dB(A)
Tonality / Impulsiveness correction	5			dB
Minimum distance to receiver	20			m
Distance attenuation (-6 dB per doubling of distance)	-26			dB
Acoustic barrier screening	0.0			dB
Ground absorption	0.0			dB
Façade reflection	2.5			dB
Impact at nearest façade	**60**	**N/A**	**83**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**53**	**N/A**	**76**	**dB(A)**
COMBINED				
Impact at nearest façade	**62**	**65**	**70**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**54**	**57**	**62**	**dB(A)**
Rw required to achieve indoor Day / Even criterion	**30**	28	28	**Rw**
Rw required to achieve indoor Night-time criterio	**35**	33	33	**Rw**

Nearest Eastern Lots

WASTE COLLECTION INDUSTRIAL BIN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	92	97	102	dB(A)
Duration of single event	180			Seconds
Number of events in the measurement period	1			Events
Total time duration of combined events	180.0			Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	79	N/A	102	dB(A)
Tonality / Impulsiveness correction	5			dB
Minimum distance to receiver	14			m
Distance attenuation (-6 dB per doubling of distance)	-23			dB
Acoustic barrier screening	0.0			dB
Ground absorption	0.0			dB
Façade reflection	2.5			dB
Impact at nearest façade	**64**	**N/A**	**87**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**56**	**N/A**	**79**	**dB(A)**
COMBINED				
Impact at nearest façade	**57**	**62**	**70**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**50**	**55**	**62**	**dB(A)**
Rw required to achieve indoor Day / Even criterion	26	26	**28**	**Rw**
Rw required to achieve indoor Night-time criterio	31	31	**33**	**Rw**

TION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Setback screened southern lots

CAR DOOR CLOSURES	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	75	77	80	dB(A)
Duration of single event		1.5		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	80	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		30.5		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		-9.6		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**24**	**N/A**	**48**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**17**	**N/A**	**41**	**dB(A)**
	264.7081	N/A	48	

CAR ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	73	74	75	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	54	N/A	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		30.5		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		-9.6		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**17**	**N/A**	**38**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**10**	**N/A**	**31**	**dB(A)**
	52.83086	N/A	38	

CAR MOVEMENTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	68	70	73	dB(A)
Duration of single event		15		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		225.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		-9.9		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**18**	**N/A**	**35**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**11**	**N/A**	**28**	**dB(A)**
	65.16223	N/A	35	

TRUCK ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	78	81	83	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		12.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	53	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		30.5		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**26**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**19**	**N/A**	**N/A**	**dB(A)**
	402.0491	N/A	N/A	

TRUCK MOVEMENT	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	87	89	90	dB(A)
Duration of single event		45		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		180.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	N/A	90	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**46**	**N/A**	**62**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**39**	**N/A**	**55**	**dB(A)**

Nearest northern lots

CAR DOOR CLOSURES	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	75	77	80	dB(A)
Duration of single event		1.5		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	80	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		106		m
Distance attenuation (-6 dB per doubling of distance)		-41		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**23**	**N/A**	**47**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**15**	**N/A**	**39**	**dB(A)**
	191.8528	N/A	47	

CAR ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	73	74	75	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		45.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	54	N/A	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		106		m
Distance attenuation (-6 dB per doubling of distance)		-41		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**16**	**N/A**	**37**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**8**	**N/A**	**29**	**dB(A)**
	39.47283	N/A	37	

CAR MOVEMENTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	68	70	73	dB(A)
Duration of single event		15		Seconds
Number of events in the measurement period		15		Events
Total time duration of combined events		225.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	56	N/A	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		108		m
Distance attenuation (-6 dB per doubling of distance)		-41		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**18**	**N/A**	**35**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**10**	**N/A**	**27**	**dB(A)**
	60.12187	N/A	35	

TRUCK ENGINE STARTS	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	78	81	83	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		12.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	53	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-44		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**12**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**5**	**N/A**	**N/A**	**dB(A)**
	16.6225	N/A	N/A	

TRUCK MOVEMENT	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	87	89	90	dB(A)
Duration of single event		45		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		180.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	N/A	90	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		148		m
Distance attenuation (-6 dB per doubling of distance)		-43		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**33**	**N/A**	**49**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**26**	**N/A**	**42**	**dB(A)**

OFFSITE ACTIVITY NOISE PREDICTION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Setback screened southern lots

TRUCK AIRBRAKES at driveway crossover	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		108		m
Distance attenuation (-6 dB per doubling of distance)		-41		dB
Offsite building screening		-5.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**25**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**18**	**N/A**	**N/A**	**dB(A)**
	338.597	N/A	N/A	

TRUCK AIRBRAKES at building	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		-8.3		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**32**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**25**	**N/A**	**N/A**	**dB(A)**
	1710.014	N/A	N/A	

FORKLIFT MOVEMENTS OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	71	74	75	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	68	74	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-18		dB
Offsite building screening		-8.3		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**44**	**50**	**51**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**36**	**42**	**43**	**dB(A)**
	24507.88	50	51	

FORKLIFT LOADING TRUCK	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	70	72	77	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	67	72	77	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-18		dB
Offsite building screening		-8.3		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**43**	**48**	**53**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**35**	**40**	**45**	**dB(A)**
	19467.14	48	53	

FORKLIFT LOADING TRUCK WITH HORN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	72	75	92	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		9.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-18		dB
Offsite building screening		-8.3		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**27**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**19**	**N/A**	**N/A**	**dB(A)**

Nearest northern lots

TRUCK AIRBRAKES at driveway crossover	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		148		m
Distance attenuation (-6 dB per doubling of distance)		-43		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**28**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**20**	**N/A**	**N/A**	**dB(A)**
	530.511	N/A	N/A	

TRUCK AIRBRAKES at building	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	90	95	98	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		4		Events
Total time duration of combined events		8.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	63	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-44		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**27**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**20**	**N/A**	**N/A**	**dB(A)**
	555.3988	N/A	N/A	

FORKLIFT MOVEMENTS OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	71	74	75	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	68	74	75	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-31		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**39**	**45**	**46**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**32**	**38**	**39**	**dB(A)**
	7959.897	45	46	

FORKLIFT LOADING TRUCK	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	70	72	77	dB(A)
Duration of single event		300		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	67	72	77	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-31		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**38**	**43**	**48**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**31**	**36**	**41**	**dB(A)**
	6352.771	43	48	

FORKLIFT LOADING TRUCK WITH HORN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	72	75	92	dB(A)
Duration of single event		3		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		9.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	N/A	N/A	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-31		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**22**	**N/A**	**N/A**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**14**	**N/A**	**N/A**	**dB(A)**

TION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr\ levels}$ are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Setback screened southern lots

PEOPLE TALKING OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	65	70	73	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	65	70	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		33		m
Distance attenuation (-6 dB per doubling of distance)		-30		dB
Offsite building screening		-6.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**31**	**36**	**39**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**24**	**29**	**32**	**dB(A)**
	1264.891	56	58	

CYCLONE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	61	62	63	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	61	62	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		37		m
Distance attenuation (-6 dB per doubling of distance)		-22		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**47**	**48**	**49**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**39**	**40**	**41**	**dB(A)**
	46541.36	48	49	

NUT RUNNER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	52	61	63	dB(A)
Duration of single event		30		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		900.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	61	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		37		m
Distance attenuation (-6 dB per doubling of distance)		-5		dB
Offsite building screening		-6.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**42**	**57**	**59**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**35**	**50**	**52**	**dB(A)**
	16198.97	57	59	

DROPPING TIMBER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	53	56	58	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		60		Events
Total time duration of combined events		120.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	38	N/A	58	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		36		m
Distance attenuation (-6 dB per doubling of distance)		-3		dB
Offsite building screening		-6.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**37**	**N/A**	**56**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**29**	**N/A**	**49**	**dB(A)**
	4487.914	N/A	56	

FRONT END LOADER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	77	80	82	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	80	82	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		68		m
Distance attenuation (-6 dB per doubling of distance)		-21		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**55**	**61**	**63**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**48**	**54**	**56**	**dB(A)**

Nearest northern lots

PEOPLE TALKING OUTSIDE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	65	70	73	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	65	70	73	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-44		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**24**	**29**	**32**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**16**	**21**	**24**	**dB(A)**
	249.929	29	32	

CYCLONE	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	61	62	63	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		6		Events
Total time duration of combined events		3600.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	61	62	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		250		m
Distance attenuation (-6 dB per doubling of distance)		-38		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**30**	**31**	**32**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**23**	**24**	**25**	**dB(A)**
	1019.442	31	32	

NUT RUNNER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	52	61	63	dB(A)
Duration of single event		30		Seconds
Number of events in the measurement period		30		Events
Total time duration of combined events		900.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	46	61	63	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-18		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**36**	**51**	**53**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**28**	**43**	**45**	**dB(A)**
	3961.115	51	53	

DROPPING TIMBER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	53	56	58	dB(A)
Duration of single event		2		Seconds
Number of events in the measurement period		60		Events
Total time duration of combined events		120.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	38	N/A	58	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-16		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**30**	**N/A**	**50**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**23**	**N/A**	**42**	**dB(A)**
	1038.906	N/A	50	

FRONT END LOADER	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	77	80	82	dB(A)
Duration of single event		600		Seconds
Number of events in the measurement period		3		Events
Total time duration of combined events		1800.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	74	80	82	dB(A)
Tonality / Impulsiveness correction		0		dB
Minimum distance to receiver		255		m
Distance attenuation (-6 dB per doubling of distance)		-33		dB
Offsite building screening		-6.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**38**	**44**	**46**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**30**	**36**	**38**	**dB(A)**

'ION CALCULATIONS: ($L_{A10\ 1hr}$ and $L_{A01\ 1hr}$ levels are represented as N/A if the duration of events do not occur for 10% or 1% of the 1 hour period)

Setback screened southern lots

WASTE COLLECTION INDUSTRIAL BIN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	92	97	102	dB(A)
Duration of single event		180		Seconds
Number of events in the measurement period		1		Events
Total time duration of combined events		180.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	79	N/A	102	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		41		m
Distance attenuation (-6 dB per doubling of distance)		-32		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**54**	**N/A**	**77**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**47**	**N/A**	**70**	**dB(A)**
COMBINED				
Impact at nearest façade	**57**	**61**	**63**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**50**	**54**	**56**	**dB(A)**
Rw required to achieve indoor Day / Even criterion	26	**25**	22	**Rw**
Rw required to achieve indoor Night-time criterio	31	**30**	27	**Rw**

Nearest northern lots

WASTE COLLECTION INDUSTRIAL BIN	Acoustic Quality Objectives			
	LAeq	LA10	LA01	
Noise source level for single event	92	97	102	dB(A)
Duration of single event		180		Seconds
Number of events in the measurement period		1		Events
Total time duration of combined events		180.0		Seconds
	LAeq 1hr	LA10 1hr	LA01 1hr	
Noise source level for assessment time period	79	N/A	102	dB(A)
Tonality / Impulsiveness correction		5		dB
Minimum distance to receiver		150		m
Distance attenuation (-6 dB per doubling of distance)		-44		dB
Offsite building screening		0.0		dB
Ground absorption		0.0		dB
Façade reflection		2.5		dB
Impact at nearest façade	**43**	**N/A**	**66**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**35**	**N/A**	**58**	**dB(A)**
COMBINED				
Impact at nearest façade	**45**	**51**	**53**	**dB(A)**
Reduction through open window	-5	-5	-5	dB
Impact inside open window (excludes façade correcti	**37**	**43**	**45**	**dB(A)**
Rw required to achieve indoor Day / Even criterion	13	**14**	11	**Rw**
Rw required to achieve indoor Night-time criterio	18	**19**	16	**Rw**

Job no.	22143a
Rw Calculations to AS2021:2015	

Aircraft Noise	Building	Impact	Criteria	ANR	Sc	Floor Area	Height	RT60	C	Kc	ANAc	Rw
Space	Component	dB(A)	dB(A)	dB(A)	(m2)	(m2)	(m)	(s)				
Crimson Modified												
Living / Dining / Kitchen / Study	Entry Door	88.0	55	33.0	1.90	58.09	2.55	0.70	5	-8	25.32	**30**
	Sliding Door	88.0	55	33.0	6.67	58.09	2.55	0.70	5	-8	30.78	**36**
	Windows	88.0	55	33.0	6.00	58.09	2.55	0.70	5	-7	31.32	**36**
	External Wall	88.0	55	33.0	37.96	58.09	2.55	0.70	5	-6	40.33	**45**
	Roof / Ceiling	88.0	55	33.0	58.09	58.09	2.55	0.70	5	0	48.18	**53**
Master Bedroom	Windows	88.0	50	38.0	1.45	13.32	2.55	0.50	3	-6	33.85	**39**
	External Wall	88.0	50	38.0	13.83	13.32	2.55	0.50	3	-6	43.66	**49**
	Roof / Ceiling	88.0	50	38.0	13.32	13.32	2.55	0.50	3	0	49.50	**54**
Ensuite	Windows	88.0	60	28.0	0.45	5.38	2.55	0.50	3	-6	22.75	**28**
	External Wall	88.0	60	28.0	5.49	5.38	2.55	0.50	3	-6	33.59	**39**
	Roof / Ceiling	88.0	60	28.0	5.38	5.38	2.55	0.50	3	0	39.50	**44**
Bedroom 2	Windows	88.0	50	38.0	1.27	11.16	2.55	0.50	3	-6	34.05	**39**
	External Wall	88.0	50	38.0	7.10	11.16	2.55	0.50	3	-6	41.53	**47**
	Roof / Ceiling	88.0	50	38.0	11.16	11.16	2.55	0.50	3	0	49.50	**54**
Bathroom	Windows	88.0	60	28.0	0.41	4.62	2.55	0.50	3	-6	22.97	**28**
	External Wall	88.0	60	28.0	4.26	4.62	2.55	0.50	3	-6	33.14	**38**
	Roof / Ceiling	88.0	60	28.0	4.62	4.62	2.55	0.50	3	0	39.50	**44**
Laundry	Door	88.0	60	28.0	1.67	4.50	2.55	0.50	3	-6	29.20	**34**
	External Wall	88.0	60	28.0	3.15	4.50	2.55	0.50	3	-6	31.94	**37**
	Roof / Ceiling	88.0	60	28.0	4.50	4.50	2.55	0.50	3	0	39.50	**44**

Aircraft Noise	Building	Impact	Criteria	ANR	Sc	Floor Area	Height	RT60	C	Kc	ANAc	Rw
Space	Component	dB(A)	dB(A)	dB(A)	(m2)	(m2)	(m)	(s)				
Oakley Modified												
Living / Dining / Kitchen	Entry Door	88.0	55	33.0	1.90	47.66	2.55	0.70	5	-8	26.18	**31**
	Sliding Door	88.0	55	33.0	5.12	47.66	2.55	0.70	5	-8	30.49	**35**
	Windows	88.0	55	33.0	2.20	47.66	2.55	0.70	5	-6	28.81	**34**
	External Wall	88.0	55	33.0	14.51	47.66	2.55	0.70	5	-6	37.01	**42**
	Roof / Ceiling	88.0	55	33.0	47.66	47.66	2.55	0.70	5	0	48.18	**53**
Master Bedroom	Windows	88.0	50	38.0	3.15	18.79	2.55	0.50	3	-6	35.74	**41**
	External Wall	88.0	50	38.0	23.85	18.79	2.55	0.50	3	-6	44.53	**50**
	Roof / Ceiling	88.0	50	38.0	18.79	18.79	2.55	0.50	3	0	49.50	**54**
Ensuite	Windows	88.0	60	28.0	0.41	5.21	2.55	0.50	3	-6	22.45	**27**
	External Wall	88.0	60	28.0	5.46	5.21	2.55	0.50	3	-6	33.70	**39**
	Roof / Ceiling	88.0	60	28.0	5.21	5.21	2.55	0.50	3	0	39.50	**44**
Bedroom 2	Windows	88.0	50	38.0	2.27	9.28	2.55	0.50	3	-6	37.37	**42**
	External Wall	88.0	50	38.0	13.75	9.28	2.55	0.50	3	-6	45.20	**50**
	Roof / Ceiling	88.0	50	38.0	9.28	9.28	2.55	0.50	3	0	49.50	**54**
Bedroom 3	Windows	88.0	50	38.0	2.27	9.28	2.55	0.50	3	-6	37.37	**42**
	External Wall	88.0	50	38.0	13.75	9.28	2.55	0.50	3	-6	45.20	**50**
	Roof / Ceiling	88.0	50	38.0	9.28	9.28	2.55	0.50	3	0	49.50	**54**
Bathroom	External Wall	88.0	60	28.0	7.65	6.36	2.55	0.50	3	-6	34.30	**39**
	Roof / Ceiling	88.0	60	28.0	6.36	6.36	2.55	0.50	3	0	39.50	**44**
Laundry	External Wall	88.0	60	28.0	6.60	4.00	2.55	0.50	3	-6	35.68	**41**
	Roof / Ceiling	88.0	60	28.0	4.00	4.00	2.55	0.50	3	0	39.50	**44**

Aircraft Noise	Building	Impact	Criteria	ANR	Sc	Floor Area	Height	RT60	C	Kc	ANAc	Rw
Space	Component	dB(A)	dB(A)	dB(A)	(m2)	(m2)	(m)	(s)				
Community Building												
Multi-purpose Room + Bar	Bifold Window	88.0	55	33.0	3.24	77.78	2.70	0.70	6	-6	28.92	**34**
	Stacker Doors	88.0	55	33.0	14.70	77.78	2.70	0.70	6	-6	35.49	**40**
	Sldiing Door	88.0	55	33.0	7.35	77.78	2.70	0.70	6	-6	32.48	**37**
	Windows	88.0	55	33.0	6.30	77.78	2.70	0.70	6	-6	31.81	**37**
	External Wall	88.0	55	33.0	48.33	77.78	2.70	0.70	6	-6	40.65	**46**
	Roof / Ceiling	88.0	55	33.0	77.78	77.78	2.70	0.70	6	0	48.72	**54**
Library / Craft Room	Windows	88.0	55	33.0	11.70	39.91	2.70	0.70	3	-6	34.38	**39**
	External Wall	88.0	55	33.0	39.06	39.91	2.70	0.70	3	-6	39.62	**45**
	Roof / Ceiling	88.0	55	33.0	39.91	39.91	2.70	0.70	3	0	45.71	**51**