Acoustics RB Pty Ltd

**Report No. 21-1305.R08**

# Reconfiguring a Lot Application
# Foreverlen Stages 01a, 01b, 02, 03 and 04
# Caboolture West NDP1

# Amended Noise Impact Assessment

**May 2024**

# DOCUMENT CONTROL PAGE

## Reconfiguring a Lot Application
## Foreverlen Stages 01a, 01b, 02, 03 and 04
## Caboolture West NDP1

## Noise Impact Assessment

## Report No. 21-1305.R08

**Report Prepared by**

Acoustics RB Pty Ltd
PO Box 150
Wilston Q 4051

Ph: +61 7 3356 5555

e-mail: russell@acousticsrb.com.au

**Report Prepared for**

Foreverlen Pty Ltd
ABN 14 619 369 612
PO Box 487
Noosa Heads Q 4567

Attention: Mr Ian Worthington

**Author:** **Russell Brown**
**Status:** **Final**
**Date of Issue:** **16 May 2024**

**History of Revisions**

| Date | Report No | Changes / Page Reference |
|---|---|---|
| 16 December 2022 | 21-1305.R04.Rev1 | Assessment and control of road traffic noise. |
| 22 June 2023 | 22-1356.R01.Rev1 | Noise impact assessment of service station and car wash. |
| 13 October 2023 | 21-1305.R08 | Combined impact assessment of each noise source. |
| 22 November 2023 | 21-1305.R08.Rev1 | Combined Impact assessment of each noise source using Rev7 of Thomson Adsett plans for design of service station and carwash. |
| 16 May 2024 | 21-1305.R08.Rev2 | Combined impact assessment of each noise source for design of service station and carwash based on Thomson Adsett Site Plan Rev10 of and Ground Floor Plan Rev11 plus change to hours. |

**Record of Distribution**

| Document Type | Revision No. | Destination |
|---|---|---|
| electronic | Final | Foreverlen Pty Ltd via Foreverlen Property Group |
| electronic | Final | Collier's Engineering & Design |

## SUMMARY

In 2001, Foreverlen Pty Ltd lodged a Reconfiguring a Lot Application with Moreton Bay Regional Council for approval over land in Upper Caboolture comprising Lot 1 on RP866105 and part of Lot 12 on RP866105. The application (MBRC Development Application No DA/2021/4699) sought approval for re-development of the land to generate 179 residential allotments together with one area of local Park recreation space, two Green Network parcels with detention basins/drainage corridor, one balance lot and two lots designated for commercial development, with the development being undertaken over four stages, ie Stages 01a, 01b, 02, 03 and 04 of Lilywood Landings Estate.

Because the site adjoins Caboolture River Road, which is an arterial road under Council's road hierarchy, Acoustics RB Pty Ltd was engaged by Foreverlen Pty Ltd to conduct an assessment of the impact of the road traffic noise intrusion onto the site and to provide recommendations for the control of any excessive levels of road traffic noise intrusion. The results of that assessment were presented in Report No 21-1305.R04.Rev1 dated 16 December 2022.

In addition, in the first half of 2022, Foreverlen Pty Ltd lodged a Material Change of Use application with Moreton Bay Regional Council for approval to develop a Service Station and Car Wash on land located at Lot 2000 Lilywood Landings Estate. MBRC Development Application No DA/2022/1840 refers. It is noted that Lot 2000 was also (i) part of Lot 12 on RP866105 and (ii) one of the two lots designated for the commercial development under Application No DA/2021/4699.

Because of the proximity of Lot 2000 to existing and future residential uses, Council required that the applicant undertake an assessment of the impact of the noise generated by the proposed Service Station and Car Wash and emitted to these existing and future residential uses. The assessment was to be conducted in accordance with the provisions of Council's SC 6.17 *Planning Scheme Policy – Noise*.

Consequently, Acoustics RB Pty Ltd was engaged by Foreverlen Pty Ltd to undertake an assessment of the expected impact of the relevant environmental noise sources and to prepare the required noise impact assessment (NIA) report. The results of that assessment were presented in Report No 21-1356.R01.Rev1 dated 22 June 2023.

Subsequently, on 23 August 2023, Moreton Bay Regional Council, issued a Decision Notice to Foreverlen Pty Ltd approving Development Application No DA/2021/4699. The approval was subject to conditions.

At Condition 2B, Council imposed a requirement for the applicant to submit an amended NIA report. The purpose of the amended NIA report was (i) to address the acoustical impact of both (a) the noise from road traffic on Caboolture River Road and (b) the noise from the proposed Service Station and Car Wash use on Lot 2000 and (ii) to provide recommendations for the barrier arrangement to address intrusion from both sources of noise to lots of approved Stages 01a, 01b, 02, 03 and 04.

As agreed with Council on Monday 28 August 2023, the most appropriate method of compiling the required amended NIA report was to incorporate the relevant sections of the NIA report prepared for proposed Service Station and Car Wash use on Lot 2000 (ie Report No 21-1356.R01.Rev1 dated 22 June 2023) into the road traffic noise impact assessment report prepared for Stages 01a, 01b, 02, 03 and 04 (ie Report No 21-1305.R04.Rev1 dated 16 December 2022).

This report, ie Report No 21-1305.R08 is the amended NIA report. This report takes account also of recent minor changes to the design and hours of the Service Station and Cash Wash.

To adequately control noise intrusion onto approved Stages 01a, 01b, 02, 03 and 04 due both road traffic as well as the operations of the proposed Service Station and Car Wash use on Lot 2000, it was determined that noise control measures presented overpage should be implemented. Refer also Sections 7.0 and 8.0 of this report.

Control of Road Traffic Noise Intrusion

As required by Conditions 2 and 4 of Decision Notice for Application No DA/2021/4669 and to adequately control road traffic noise intrusion into the proposed residential allotments, it is recommended that the barrier arrangement shown in Figure 12 of this report be constructed.

This barrier is to be 1.8m high acoustic barrier constructed along the following boundaries:-

(i) Southern boundaries of Lots 41-50, plus

(ii) Four truncation chords of boundary at the south-western corner of Lot 50, plus

(iii) Remainder of the western boundary of Lot 50, plus

(iv) Western boundary of the pedestrian connection to the Internal District Collector Road, plus

(v) Western boundaries of Lot 51 and 52.

SC 6.17 *Planning Scheme Policy – Noise* does not provide specifications for the design and/or construction of acoustic fences. Notwithstanding, guidance on the appropriate design specifications and construction requirements can be drawn from (i) Council's Standard Drawing No SF-1520 for typical construction details of post and paling acoustic barriers and (ii) Council's Standard Drawing No SF-1521 for typical construction details of post and board acoustic barriers.

To ensure that adequate control of road traffic noise intrusion into the habitable spaces of any dwellings located on Lots 29-53 is achieved, the particular dwellings should be designed and constructed in accordance with AS3671-1989 *Acoustics – Road traffic noise intrusion - Building siting and construction* to achieve compliance with the internal sound levels of AS/NZS 2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors*.

It is noted that this requirement has been adopted in Property Note DS08 of Decision Notice for Application No DA/2021/4669, albeit inadvertently including Lot 54 (which lies beyond 100m from Caboolture River Road) as well.

Control of Noise Intrusion from Service Station and Car Wash

To achieve adequate control of noise emission due to the relevant noise sources and to address any reverse acoustical amenity issues, it is recommended that the following noise control actions be implemented:-

1. Adopt the current design shown in the Architect's drawings (refer Figures 4A-4H attached).
2. Restrict fuel deliveries and refuse pickups to the day time period only (ie 7:00am to 6:00pm).
3. Restrict general deliveries (ie deliveries of consumables and requisites that are sold through the service station shop) to the time period from 5:00am to 6:00pm only.
4. Restrict use of the car wash to the period from 5:00am to 10:00pm daily.
5. Install a fast-acting solid panel roll door to the entry side of each of the automatic car wash bays, with the roll door operated such that when the vehicle is being washed, at least ¾ of the car wash bay opening is closed leaving only the lower ¼ open to outside. The panels are to be solid (ie without openings) and constructed using sheet material achieving minimum superficial density of 3.5 kg/m².
6. Preclude bulk LPG deliveries (ie LPG for automotive use) to the site.
7. To control noise emission to the existing residences to the south, construct along the southern boundary of Lot 2000 the 2.0m-2.4m high barrier arrangement shown in Figure 4C (Ground Floor Plan prepared by Thomson Adsett) as well as in Figure 13, both attached.

Notes:

The barrier shown in Figure 13 is required simply to address noise emission to the south. Full control of noise emission from the Service Station and Car Wash to the future residences of Stages 01a, 01b, 02, 03 and 04 of Lilywood Landings Estate will be achieved by the erection of the barrier arrangement shown in Figure 12.

Guidance on the appropriate design specifications and construction requirements for the barrier shown in Figure 13 can be drawn also from (i) Council's Standard Drawing No SF-1520 for typical construction details of post and paling acoustic barriers and (ii) Council's Standard Drawing No SF-1521 for typical construction details of post and board acoustic barriers, with appropriate modifications made to address the specific structural design requirements of a barrier 2.4m high.

8. Select and install mechanical plant to achieve compliance with the following noise level specification.

   When measured externally at the most exposed facade of any nearby residence, the component sound pressure level, $L_{Aeq\ adj,15min}$, due to operation of all fixed mechanical plant and equipment serving all elements of the Fuel Store building and the ancillary car wash elements should not exceed the following noise level limits:-

   - Day (ie 07:00-18:00): Background noise level +3 dBA
   - Evening (ie 18:00-22:00): Background noise level +3 dBA
   - Night (22:00-07:00): Background noise level +0 dBA

9. Ensure all grates and caps are either bolted in place or located away from driveway/forecourt areas.

10. Ensure that the PA system at the site is to be used for safely purposes, ie to issue warnings or directions to patrons.

Final Note

If in addressing the requirements of Conditions 2 and 4, it were deemed necessary to simplify the barrier construction requirements, then rather than constructing the barriers in two phases (ie the barrier arrangement shown in Figure 12 followed by the barrier arrangement shown in Figure 13), both barrier arrangements may be constructed together.

# TABLE OF CONTENTS

Page

## 1.0 Introduction

In 2001, Foreverlen Pty Ltd lodged a Reconfiguring a Lot Application with Moreton Bay Regional Council for approval over land in Upper Caboolture comprising Lot 1 on RP866105 and part of Lot 12 on RP866105. The application (MBRC Development Application No DA/2021/4699) sought approval for re-development of the land to generate 179 residential allotments together with one area of local Park recreation space, two Green Network parcels with detention basins/drainage corridor, one balance lot and two lots designated for commercial development, with the development being undertaken over four stages, ie Stages 01a, 01b, 02, 03 and 04 of Lilywood Landings Estate.

At the southern extent of the land, Stage 01a adjoins Caboolture River Road which is an arterial road under Council's road hierarchy. Due to the proximity of the site to Caboolture River Road, Council required that the Applicant undertake an assessment of the impact of road traffic noise intrusion onto the site and determine the appropriate measures to achieve adequate control of any excessive road traffic noise intrusion.

Accordingly, Acoustics RB Pty Ltd was engaged by Foreverlen Pty Ltd to conduct an assessment of the impact of the road traffic noise intrusion onto the site and to provide recommendations for the control of any excessive levels of road traffic noise intrusion. The results of that assessment were presented in Report No 21-1305.R04.Rev1 dated 16 December 2022.

In addition, in the first half of 2022, Foreverlen Pty Ltd lodged a Material Change of Use application with Moreton Bay Regional Council for approval to develop a Service Station and Car Wash on land located at Lot 2000 Lilywood Landings Estate. MBRC Development Application No DA/2022/1840 refers. It is noted that Lot 2000 was also (i) part of Lot 12 on RP866105 and (ii) one of the two lots designated for the commercial development under Application No DA/2021/4699.

Because of the proximity of Lot 2000 to existing and future residential uses, Council required that the applicant undertake an assessment of the impact of the noise generated by the proposed Service Station and Car Wash and emitted to the existing and future residential uses. The assessment was to be conducted in accordance with the provisions of Council's SC 6.17 *Planning Scheme Policy – Noise*.

Consequently, Acoustics RB Pty Ltd was engaged by Foreverlen Pty Ltd to undertake an assessment of the expected impact of the relevant environmental noise sources and to prepare the required noise impact assessment (NIA) report. The results of that assessment were presented in Report No 21-1356.R01.Rev1 dated 22 June 2023.

Subsequently, on 23 August 2023, Moreton Bay Regional Council, issued a Decision Notice to Foreverlen Pty Ltd approving Development Application No DA/2021/4699. The approval was subject to conditions. At Condition 2B, Council imposed a requirement for the applicant to submit an amended NIA report. The purpose of the amended NIA report was (i) to address the acoustical impact of both (a) the noise from road traffic on Caboolture River Road and (b) the noise from the proposed Service Station and Car Wash use on Lot 2000 and (ii) to provide recommendations for the barrier arrangement to address intrusion from both sources of noise to lots of approved Stages 01a, 01b, 02, 03 and 04.

As agreed with Council on Monday 28 August 2023, the most appropriate method of compiling the required amended NIA report was to incorporate the relevant sections of the NIA report prepared for proposed Service Station and Car Wash use on Lot 2000 (ie Report No 21-1356.R01.Rev1 dated 22 June 2023) into the road traffic noise impact assessment report prepared for Stages 01a, 01b, 02, 03 and 04 (ie Report No 21-1305.R04.Rev1 dated 16 December 2022).

This report, ie Report No 21-1305.R08 is the amended NIA report. This report takes account also of (i) recent minor changes to the design of the Service Station and Cash Wash and (ii) a minor modification to the hours for general deliveries to the site. (Ref. Section 2.2 following.)

## 2.0 Existing Situation and Proposed Development

### 2.1 Approved Residential Development

The location of the subject site is shown in Figure 1. The real property description of the site is Lot 1 on RP866105 and part of Lot 12 on RP866105.

The local authority is Moreton Bay Regional Council.

The site is currently occupied by a dwelling and outbuildings.

The Concept Plan for the entirety of the development over the entirety of Lilywood Landings Estate, ie over Lots 1 and 12 on RP866105, is shown in Figure 2A.

The approved development over the land subject to the Approval No DA/2021/4699, ie Stages 01a, 01b, 02, 03 and 04, is presented in Figure 2B. As noted above in Section 1.0, the development application sought approval to re-develop the site to generate 179 residential allotments together with one area of local Park recreation space, two Green Network parcels with detention basins/drainage corridor, one balance lot and two lots designated for commercial development (ie Lots 2000 and 2001). As shown in Figure 2B, the designation of Lots 2000 and 2001 as "Commercial" has been changed to "Removed Reference to Commercial Lots Annotated by Council 23/08/2023".

As is evident in Figure 2B, Stage 01a is located in close proximity to Caboolture River Road, which is an arterial road under the control of Moreton Bay Regional Council.

### 2.2 Proposed Service Station and Car Wash on Lot 2000

As noted above, the site of the proposed Service Station and Car Wash development is Lot 2000, part of Lot 12 on RP866105. The area of the site is 3196.5m$^2$. The site is located in the Emerging Community zone.

The location of the subject site and the proximity of the site to nearby existing and proposed future residential uses are both shown in Figures 3A and 3B.

Lot 2000 is also situated in close proximity to Caboolture River Road. Adjacent to the site, and based on 2021 data, Caboolture River Road carries an average of 3470 vehicles per day of which 5% are heavy vehicles. As noted in Section 5.1.1 following, the volume of traffic on Caboolture River Road adjacent to the site is predicted to increase to 25000 vpd at 2032 with 5% HV. This is a very substantial increase in expected road traffic volumes.

As shown in Figure 3B, Lot 2000 will also adjoin the yet-to-be-constructed road located immediately to the north which will connect Caboolture River Road to the E-W arterial road.

The current application seeks approval for the development of a Service Station comprising:

(i) a service station shop (fuel store) with a total floor area of 194m²;
(ii) a fuel forecourt under canopy for retail fuel dispensers;
(iii) a refuse and services with a combined area of 37m²;
(iv) on-site car parking for 15 motorcars together with a loading and refuse bay as well as an air and water bay; and
(v) an ancillary car wash consisting of:
    a. two automatic car wash bays covering a total of 100m²
    b. one dog wash bay and one plant room, each 27m$^2$ in area, and
    c. three car vacuum bays with a total area of 86m².

Approval is sought for 24 hours a day (ie midnight-midnight), seven-day a week operation for the service station components of the proposed development, with service vehicles (ie waste collection and fuel deliveries) restricted to the day time period only (ie 07:00-18:00) and general deliveries of consumables and requisites sold through the service station shop restricted to the time period from 05:00 to 18:00.

In addition, approval is sought for 17 hours a day (ie 05:00-22:00), seven-day a week operation for the ancillary car wash elements of the proposed development.

Note:

> In the Information Request issued by Council on 16 June 2022 (refer also Section 4.2.2 following), Council suggested that consideration be given to limiting the hours of operation of the ancillary car wash to 07:00-22:00 in order that the height of the barrier originally proposed to be constructed along the boundaries of Lots 50-54 could be reduced to no greater than 2.0m.
>
> From a re-examination of the impact of the noise from the car wash, it was determined that the height of the barrier to Lots 50-54 could be reduced to 1.8m if the hours of operation of the two ancillary car wash elements of the proposed development were to be reduced from 24 hours per day to the period 05:00-22:00 only. It was also determined that adequate control of noise emitted from the Service Station and Cash Wash could still be achieved if the extent of the 1.8m high barrier along the western boundaries of the closest new lots were limited to Lots 50-52 only, ie there was no longer a requirement to erect a barrier along the western boundaries of Lots 52 and 54.
>
> Refer also results of assessment presented in Sections 6.2 and 6.3 following.

Since the time of preparation of the original version of Report No 21-1305.R08 (ie13 October 2023), the operator of the facility has been finalised resulting in a number of minor changes being incorporated into the design of the proposed development. The final design is presented in the following set of drawings by Thomson Adsett:

- No 22.0014.17 A-0.00 Rev11 Site Context Plan
- No 22.0014.17 A-0.00 Rev10 Site Plan
- No 22.0014.17 A-0.00 Rev11 Ground Floor Plan
- No 22.0014.17 A-0.00 Rev11 Site Elevations Sheet 1
- No 22.0014.17 A-0.00 Rev7 Site Elevations Sheet 2
- No 22.0014.17 A-0.00 Rev11 Building Elevation & Sections
- No 22.0014.17 A-0.00 Rev11 3-D Site Axonometric Views
- No 22.0014.17 A-0.00 Rev10 Site Perspective Views

These drawings are reproduced in Figures 4A-4H.

As is evident in Figures 4B-4H, landscaping will be provided along the northern and part of the eastern sides of the site. Importantly, as shown in Figures 4B and 4C, a 2.0-2.4m high acoustic fence will be constructed along almost the full extent of the southern boundary. Refer also Figure 13 attached.

## 3.0 Relevant Roads for Assessment of Road Traffic Noise Impact

As noted above in Section 2.0, the site adjoins Caboolture River Road which is an arterial road. It is also noted that a new E-W Road serving NDP1 is shown on MBRC Figure 7.2.3.9 *Neighbourhood Development Plan No.1 (NDP 1)*. The alignment of the new E-W Road shown in Figure 5 attached. (Refer heavy dashed line shown running from Tinny Road to the north-west extent of NDP1.)

By reference to SC 6.17 *Planning Scheme Policy – Noise*, it will be necessary to assess the impact of road traffic noise intrusion onto all lots located within 100m of the arterial road section of the E-W Road. (Refer also Section 4.1.1 following.)

As is evident in Figure 5, and by reference to Figure 2A however, it can be seen that the Foreverlen land is located more than 100m from the E-W Road. Accordingly, there will be no requirement to consider the impact of noise intrusion onto the subject site from road traffic on the E-W Road. Rather, the only road of significance is Caboolture River Road.

# 4.0 Council Requirements

## 4.1 SC 6.17 Planning Scheme Policy - Noise – Section 8 Control of Road Traffic Noise Intrusion

### 4.1.1 Overview re Control of Road Traffic Noise Intrusion

The requirements for assessing road traffic noise intrusion for Reconfiguring a Lot applications are presented at Section 8.1 of Council's SC 6.17 *Planning Scheme Policy – Noise*.

Section 8.1 of SC 6.17 is reproduced below.

> **8. Assessment of road traffic and railway noise**
>
> The following outlines the process for establishing acceptable acoustic amenity at sites impacted by noise from roads and railways.
>
> **8.1 Reconfiguring a lot**
>
> A transport noise impact assessment report is to be provided where development involves reconfiguring a lot in the General Residential, Emerging Community. Rural Residential zones and Township Residential Precinct where:
>
> 1. proposed lots are located within:
>    a. 50 metres of a current or future designated sub arterial; or
>    b. 100 metres of a current or future designated arterial road; or
>    c. 150 metres of a highway or railway; or
>    d. extractive resource transport buffer
> 2. where otherwise requested by Council.
>
> Note - Does not apply if the proposed development site is within a designated transport noise corridor and the Department of Transport and Main Roads is a referral agency.
>
> The assessment is to be in accordance with MP 4.4 of the QDC. The assessment is to identify the noise category applicable to each lot in the proposed development for both lower and upper levels. Noise categories are defined in Schedule 3 of MP4.4.
>
> In addition the assessment is to address the requirement for residential development to have private open space that meets the Environmental Emission Criteria identified in Department of Transport and Main Roads *Policy for Development on land affected by Environmental Emissions from Transport and Transport Infrastructure Version 2 or as amended.*
>
> Note – Noise Categories are derived from the identified noise levels at 1 metre from the facade of the proposed or existing building. For the purposes of this policy the facade is to be determined at the deemed to be building setback or proposed building envelope or the lot boundary.
>
> **8.1.1 Property notes**
>
> A property note will be applied to all new lots identified as Noise Category 1 or higher. The development approval will advise of the intended property note generally in accordance with the following example [overpage].

> *The following notation will be recorded on Council's property system for proposed Lots xxxxxxx*
>
> *This lot is impacted by road traffic noise. A Traffic Noise Impact Report by xxxx, xxxxxx, has been prepared in relation to this lot. The report identifies this lot as being at Noise Level Category X. Mandatory Part 4.4 of the Queensland Development Code identifies the required noise reduction building treatments applicable to each Noise Category.*
>
> *Further assessment by a suitably qualified acoustic expert should be sought in order to determine the appropriate building design and treatment required to effectively mitigate noise impacts for the provision of acceptable acoustic amenity in private open spaces and habitable rooms.*

Note – where lots are impacted by noise sources other than transport alternative property notes will be applied as deemed appropriate.

The key provisions of s.8.1 as they apply to the subject development are summarised below:-

- The provisions of SC 6.17 apply to lots located within 100m of a designated arterial road, ie Caboolture River Road.
- A Transport Noise Impact Assessment report is to be prepared which identifies the QDC MP 4.4 noise categories applicable to the development.
- The level of road traffic noise intrusion into the designated private open space areas is to comply with the limits set under DTMR *Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure* (EEP).
- Property notes are to be applied to all new lots identified as Noise Category 1 or higher.

The requirements with respect to the QDC MP 4.4 noise categories are discussed in further detail in the Sections 4.1.2 and 4.1.3 following together with a discussion regarding the limits set by DTMR for acceptable levels of road traffic noise intrusion into private open space areas.

### 4.1.2 Examination of Applicability of QDC MP 4.4 *Buildings in a Transport Noise Corridor*

As noted above in Section 4.1.1, Section 8 of SC 6.17 outlines the process for establishing acceptable acoustical amenity at sites impacted by noise from roads and railways.

At stated at s.8.1 *Reconfiguring a Lot* of SC 6.17 of the extract above:-

> "The [transport noise impact] assessment is to be in accordance with MP 4.4 of the QDC. The assessment is to identify the noise category applicable to each lot in the proposed development for both lower and upper levels. Noise categories are defined in Schedule 3 of MP 4.4."

The purpose of QDC MP 4.4 is to ensure control of transport noise intrusion into particular residential buildings, specifically "relevant residential buildings", where a relevant residential building must be located within a Transport Noise Corridor (TNC) as defined at Chapter 8B of *Building Act 1975* and, more particularly, in these circumstances, at s.246X and s.246Y of the Act.

It is noted that the site is not located within a gazetted TNC. As a result, the provisions of QDC MP 4.4 are not triggered. Consequently, it is not appropriate to apply QDC MP 4.4 as a basis for building design.

Further discussion re this matter is presented in Attachment A.

Notwithstanding, and as discussed with Council, it is noted that, at Section 5 of QDC MP 4.4, AS3671-1989 *Acoustics – Road traffic noise intrusion - Building siting and construction* and AS/NZS 2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors* are both cited as reference documents for QDC MP 4.4. In fact, the minimum $R_w$ ratings set at Schedule 1 of the Code have been derived directly by application of the calculation methods of AS3671-1989 to achieve compliance with the recommended internal sound levels of AS/NZS 2107:2016.

Furthermore, when undertaking a site-specific acoustical design review of any relevant residential building located within a TNC, QDC MP 4.4 permits such assessments to be conducted using the more refined and more accurate noise level calculation methods of AS3671-1989 to achieve compliance with the recommended internal sound levels of AS/NZS 2107:2016.

Additionally, prior to the introduction of QDC MP 4.4 on 1 September 2010, all assessments to determine the degree of upgrade required to be implemented into any noise-affected residence located on land adjoining a State-controlled road were conducted using the methods of AS3671-1989 to achieve compliance with the recommended internal sound levels of AS/NZS 2107:2016 [I].

Consequently, it can be readily and reasonably concluded that the appropriate means of achieving adequate control of road traffic noise intrusion is to apply the more robust methodology of the calculation methods of AS3671-1989 to the design of noise affected residences, with the goal being to achieve compliance with the recommended internal sound levels of AS/NZS 2107:2016. This method has been adopted successfully for many other recently approved developments within the bounds of MBRC as well as in other local authority jurisdictions where gazettal of TNC's is yet to occur, notably Ipswich City Council.

Finally, it should be noted that, notwithstanding the fact that it is quite reasonable to conclude that QDC MP 4.4 cannot be applied to the current circumstances, the net result of adoption of the more robust methodology of calculation discussed above will be to achieve a more rigorous and more efficient acoustical outcome for the design of the noise-affected dwellings than would have resulted from an application of less refined procedures of QDC MP 4.4.

### 4.1.3 Applicability of Construction Categories of AS3671-1989

A discussion of AS3671-1989 together with the appropriate method of applying the calculation procedures of the Standard is presented below. Further information is presented also in Attachment B following.

AS3671-1989 sets Construction Categories by reference to $L_{Aeq,T}$ noise levels, notably $L_{Aeq,1hr\ night}$ [II] and $L_{Aeq,1hr\ day}$[III]. Noise level prediction programs determine road traffic noise levels in terms of the $L_{A10(18hour)}$[IV] noise level parameter. The offsets between $L_{A10(18hour)}$ and the day and night $L_{Aeq,T}$ values are site-specific and depend upon the hourly distribution of traffic.

Note: Construction Categories applying under AS3671-1989 are not the same as Noise Categories applying under QDC MP 4.4.

---

[I] At that time, ie prior to 1 September 2010, the version of the standard current at that time was AS/NZS 2107:2000.

[II] $L_{Aeq,1hr\ night}$ is defined as the maximum rolling average $L_{Aeq,1hr}$ value from 10:00pm to 6:00am, where the integrating time for $L_{Aeq,T}$ (ie equal energy) values used to determine the $L_{Aeq,1hr}$ value is typically 10minutes or 15 minutes.

[III] $L_{Aeq,1hr\ day}$ is defined as the maximum rolling average $L_{Aeq,1hr}$ value from 6:00am to 10:00pm, where the integrating time for $L_{Aeq,T}$ (ie equal energy) values used to determine the $L_{Aeq,1hr}$ value is typically 10minutes or 15 minutes.

[IV] $L_{10(18hour)}$ is defined by DTMR in their *Road Traffic Noise Management: Code of Practice* and by UK DoE in their *Calculation of Road Traffic*, as the arithmetic mean of each of the eighteen hourly $L_{10,1hr}$ levels between 6:00am and 12:00 midnight on an average weekday where $L_{10,1hr}$ is the noise level measured in dBA that is exceeded for 10% of the specific one hour period. It is noted that this terminology is not in strict accordance with the recommendations of Standards Australia because it does not identify the A-weighting requirement. Recognising this departure, DTMR has adopted the term $L_{A10(18hour)}$ in their *Code of Practice*. $L_{A10(18hour)}$ has been used throughout this report as a result.

To establish offsets which can be used satisfactorily in most commonly encountered situations, it is appropriate to refer to standard offset values derived from an extensive study of a large number of comparable sites in SE Queensland located adjacent to major roads [V]. When this is done, the relevant construction categories can be determined in terms of the predicted $L_{A10(18hour)}$ value directly. The derivation of the bounds of the construction categories is presented in Attachment B.

From the results presented in Attachment B, it can be seen that Construction Category 1 means that the relevant floor level of the dwelling (ie ground floor level or first floor level) is subjected to noise levels that do not exceed 48dBA $L_{A10(18hour)}$ facade-corrected. For any dwellings subject to Construction Category 1, there will be no requirement to apply any specific acoustical upgrades to the design of the relevant floor level of the dwelling.

Construction Category 2 means that the relevant floor level of the dwelling (ie ground floor level or first floor level) is subjected to noise levels in the range 48dBA to 63dBA $L_{A10(18hour)}$ facade-corrected. By reference to AS3671-1989 *Acoustics - Road Traffic Noise Intrusion - Building Siting and Construction*, "standard construction (ie brick veneer), except for the lightweight elements such as fibre cement or metal cladding or all-glass facades" is deemed to be adequate to control noise intrusion for dwellings within the Construction Category 2 band, provided all windows and external doors to the dwelling are closed.

Construction Category 3 means that the relevant floor level of the dwelling (ie ground floor level or first floor level) is subjected to noise levels in the range 63dBA [VI] to 73dBA $L_{A10(18hour)}$ facade-corrected.

Similarly, Construction Category 4 means that the relevant floor level of the dwelling (ie ground floor level or first floor level) is subjected to noise levels exceeding 73dBA $L_{A10(18hour)}$ facade-corrected.

For both Construction Categories 3 and 4, the design of the dwelling will need to be reviewed acoustically to ensure that the level of road traffic noise intrusion is adequately controlled.

Notes:

For purposes of initial guidance only, provided that none of the habitable spaces affected by road traffic noise is constructed using all-glass facades (eg full-facade areas of sliding glass doors), standard brick veneer or blockwork wall construction would normally be satisfactory in most instances to deal with external noise levels up to 63dBA $L_{A10(18hour)}$ facade-corrected, ie for Construction Category 2 dwellings. For Construction Category 3 and 4 dwellings, however, it will be necessary to (i) upgrade the acoustical performance of windows and external sliding glass doors beyond standard $R_w$ 23 performance and (ii) close windows and external doors. Further guidance is provided in AS3671-1989 *Acoustics - Road Traffic Noise Intrusion - Building Siting and Construction*.

It is stressed that **Construction** Categories applying under AS3671-1989 are not the same as **Noise** Categories applying under QDC MP 4.4. While the goal of each set of designations is the same, ie to control road traffic noise intrusion, they act in different ways to each other. There is no direct correspondence or consistent correlation between each set of designations. It is regrettable that the term "category" has been adopted by the relevant regulatory bodies for both sets of designations.

[V] Brown, AR & Brown, HD *A Re-Examination of the Relationship Between the $L_{A10(18hour)}$ Noise Level Parameter and Other Road Traffic Noise Level Parameters,* proc. Joint Conference of Australian and New Zealand Acoustical Societies, Brisbane, 2016.

[VI] DTMR and several local authorities in SE Queensland apply this limit of 63dBA $L_{A10(18hour)}$ facade-corrected as the basis of setting limits for acceptable levels of road traffic noise intrusion onto residential allotments situated adjacent to major roads.

### 4.1.4 DTMR Limits for Road Traffic Noise Intrusion into Private Open Space Areas

SC 6.17 requires that the limits for acceptable levels of road traffic noise intrusion into Private Open Space areas be set by reference to the DTMR's *Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure* (EEP). The criteria from the EEP have been adopted in *State Code 1: Development in a State-Controlled Road Environment* of *State Development Assessment Provisions* (SDAP).

Under EEP, a pair of limits has been established, with one limit of the pair applying depending on the prevailing $L_{A90(18hour)}$ noise level. These limits are as follows:-

(a) 57dBA $L_{A10(18hour)}$ free field (ie 60dBA $L_{A10(18hour)}$ facade-corrected) if the measured $L_{A90(18hour)}$ is currently ≤45dBA $L_{A90(18hour)}$ [VII]

(b) 60dBA $L_{A10(18hour)}$ free field (ie 63dBA $L_{A10(18hour)}$ facade-corrected) if the measured $L_{A90(18hour)}$ is currently >45dBA $L_{A90(18hour)}$.

## 4.2 SC 6.17 Planning Scheme Policy - Noise – Section 5 Control of Commercial Noise Emission

### 4.2.1 Overview re Control of Commercial Noise Emission

At Section 5, SC 6.17 *Planning Scheme Policy – Noise* sets limits for acceptable levels of environmental noise emission within the Emerging Community zone on three bases:-

(i) A permitted maximum exceedance of the Rating Background Level (RBL),

(ii) Compliance with fixed value acoustic amenity criteria, and

(iii) Compliance with maximum $L_{Amax}$ noise levels.

Each is discussed briefly below.

When applying the maximum exceedance of the RBL, the emitted noise level determined as the component $L_{Aeq\ adj,T}$ at a noise-sensitive use is not to exceed a value equal to the RBL plus 3dBA.

At the same location, compliance with the following external acoustic amenity criteria is also to be achieved:-

- Day (07:00-18:00): 55dBA $L_{Aeq\ adj,1hr}$
- Evening (18:00-22:00): 45dBA $L_{Aeq\ adj,1hr}$
- Night (22:00-07:00): 40dBA $L_{Aeq\ adj,1hr}$

Additionally, the level of noise emission is to comply with an internal $L_{Amax}$ night time noise level limit of 45dBA calculated as the average of the 15 highest maximum noise levels generated by the new use during the night time period.

Because the 45dBA criterion value is an internal noise level limit, it is necessary to convert the internal limit to an equivalent external noise level limit so that a consistent set of noise level can be established for the proposed development.

The method of making this conversion is explained overpage.

[VII] $L_{A90(18hour)}$ is defined as the arithmetic mean of each of the eighteen hourly $L_{A90,1hr}$ levels between 6:00am and 10:00pm on an average weekday.

In instances where windows and external doors are open, it would be usual to expect a noise level reduction achieved by a residential building facade of at least 10dBA for facade-corrected noise emission. For free field noise level assessment situations, the measured noise levels will not be affected by the reflection from the building facade. The measured noise levels will be 2.5dBA lower as a result. Consequently, the reduction that would be achieved by the building facade under free field conditions will be 7.5dBA, or 8dBA after rounding to the nearest whole decibel in accordance with standard acoustical practice [VIII].

Applying a noise level reduction value of 8dBA, the resultant equivalent external $L_{Amax}$ night time noise level limit becomes 53dBA calculated as the average of the 15 highest maximum noise levels generated by the new use during the night time period.

### 4.2.2 Requirements of Council Information Request of 16 June 2022

At Item 3 of the Information Request issued on 16 June 2022, Council made the following request:

3. *Council notes that mitigation of noise impacts from the development proposal are fundamentally linked to an adjoining application, being DA/2021/4669. As highlighted in the image below, acoustic barriers have been identified along the southern boundary of the subject application and on lots that are proposed to be created under an adjoining application. These barriers range from 2.0m–2.5m in height. Noting the significance of this intersection for Neighbourhood Development Plan Area 1 and also the relevant design outcomes sought under the Caboolture West Local Area Plan, for both material change of use and reconfiguring a lot proposals, Council has concerns over how this development and the adjoining reconfiguring a lot application responds to the streetscape and presents to Caboolture River Road.*

   *It is requested that the applicant demonstrate what reductions could be applied to the proposed barrier heights if the development were to limit the hours of operation for the ancillary car wash from 7am–10pm only.*


[VIII] While there may be certain circumstances in which it is appropriate to report predicted noise levels to the nearest 0.1dBA (ie when subtracting – either arithmetically or logarithmically – two values which differ by only a small amount, eg by 1-2dBA), in almost all other situations, it is appropriate to report resultant noise levels to the nearest whole decibel. To do otherwise, risks overstating the precision of noise level prediction algorithms.

### 4.3 Decision Notice for Application No DA/2021/4669

Decision Notice for Application No DA/2021/4669, imposed two conditions relating to acoustical matters: Conditions 2 and 4. Each is re-stated below.

| **2.** | **Amended Plan Required** | **Timing** |
|---|---|---|
| A | … | … |
| B | Submit an amended Noise Impact Report that incorporates the following:<br>• a 1.8m high acoustic barrier along proposed Lots 51 and 52;<br>• a 1.8m high acoustic barrier along the western side of the pedestrian connection to the Internal District Collector Road. To remove any doubt, this includes the acoustic fence where it extends further north of proposed Lot 50's western boundary. | Prior to submitting to the Council any request for approval of a plan of subdivision (ie a survey plan). |
| C | Obtain approval from Council for the amended Landscape Concept Plan and Noise Impact Report in accordance with (A) and (B) above. | Prior to submitting to the Council any request for approval of a plan of subdivision (ie a survey plan). |
| D | Implement the requirements and recommendations of the approved plan(s). The approved amended plan(s) will form part of the approval. | Prior to submitting to the Council any request for approval of a plan of subdivision (ie a survey plan). |

| **4.** | **Acoustic Attenuation Measures** | **Timing** |
|---|---|---|
| A | Construct the 1.8m high acoustic barrier arrangement on Lots 41-52. Provide the acoustic attenuation measures as specified in the Assessment and Control of Road Traffic Noise Intrusion report prepared by Acoustics RB Pty Ltd. | Prior to submitting to the Council any request for approval of a plan of subdivision (ie a survey plan) for each respective stage of the development. |
| B | Provide certification from a suitably qualified person that the 1.8m high acoustic barrier arrangement on Lots 41-52 has been constructed in accordance with the specifications of the Assessment and Control of Road Traffic Noise Intrusion report prepared by Acoustics RB Pty Ltd. | Prior to submitting to the Council any request for approval of a plan of subdivision (ie a survey plan) for each respective stage of the development. |

Taken together, Conditions 2 and 4 require that the following actions be undertaken:

1. Amend the original road traffic noise report, ie Report No 21-1305.R04.Rev1, to include 1.8m high barriers to Lots 51 and 52 on the western side of the pedestrian connection to the internal District Collector Road. It is noted that these barriers are those required to provide control noise from the Service Station and Car Wash development on Lot 2000.
2. Obtain from Council approval of the amended road traffic noise report.
3. Construct the 1.8m high acoustic barrier arrangement along the road boundary of Lots 41-52.
4. Provide post-construction certification that the barrier arrangement to Lots 41-52.

This report, ie Report No 21-1305.R08 [IX], is the amended report required at Condition 2B, ie Action 1 above.

[IX] This is the second revision of the report. The original report and the first version of the report were issued on 13 October 2023 and 23 November 2023, respectively.

# 5.0 Assessment and Control of Road Traffic Noise Intrusion

## 5.1 Current Road Traffic Noise Levels and Derived Noise Level Limits

### 5.1.1 General

The prediction of road traffic noise intrusion onto any site can be conducted by using the CRTN '88 [X] algorithms. These algorithms have been validated for Australian conditions. Even so, it has been well established that the algorithms generally over-predict the level of road traffic noise intrusion onto adjoining land.

The extent of the over-prediction tends to be site-specific. The degree of over-prediction is generally greater at sites with complex topography and significant distances of separation from the road as well as at sites located adjacent to signalised intersections.

In situations where the road has been formed and is operating with significant volumes of traffic, it is appropriate to conduct noise level measurements under the existing road traffic conditions. The results of these measurements can be used (i) to validate/calibrate the noise prediction model for the site or the development and, (ii) where appropriate, to establish the appropriate parameter offset values so that the equivalent facade-corrected external $L_{A10(18hour)}$ noise limits can be set.

In fact, in situations where the arterial/sub arterial road exists, Council requires that noise logging be undertaken at a representative location on the site to determine the current level of noise intrusion onto that location.

### 5.1.2 Current Road Traffic Noise Levels and Derivation of External Limits for Private Open Spaces

Monitoring of the level of noise generated by road traffic on Caboolture River Road was conducted continuously at a representative location close to the southern boundary of the site from 1:15pm Tuesday 7 June 2020 to 10:30am Tuesday 14 June 2022.

The measurement location is shown as "M1" in Figure 6A. This location was 13m from the edge of the road pavement. The measurement height was 2.2m (approx) above local ground level, ie 0.7m (approx) above existing road level.

The measurements were carried out in accordance with AS2702-1984 *Acoustics - Methods for the Measurement of Road Traffic Noise*. Weather conditions were fine. Other than on Saturday 11 June, winds were generally calm to light (of variable direction).

Test instrumentation consisted of the following:-

- Precision sound level meter: Norsonic type Nor-139 fitted with an outdoor microphone kit
- Acoustic calibrator: ARL type ND9

The results of the monitoring for a typical day (ie Thursday 9 June 2022) are presented graphically in Figure 7A.

The resultant free field $L_{10(18hour)}$ and $L_{A90(18hour)}$ values were measured to be as follows:-

- $L_{10(18hour)}$: 63.0dBA; and
- $L_{A90(18hour)}$: 42.4dBA.

[X] "Calculation of Road Traffic", UK DoE, HMSO, 1988. This is the method endorsed by Queensland Department of Transport and Main Roads and various local authorities.

### 5.1.3 Future Road Traffic Noise Levels and Derivation of External Limits for Private Open Spaces

From the results above, it can be seen that the measured $L_{A90(18hour)}$ value at Location M1 was 42.4dBA. This value is below the limit of 45dBA $L_{A90(18hour)}$ set by DTMR under EEP.

Based on traffic data provided by the Project Traffic Engineers, Lambert & Rehbein, it is noted that the prevailing AADT traffic volume on Caboolture River Road during the measurement period was approximately 3590 vpd. As is discussed further at Section 6.1 below, 3590 vpd is <15% of the forecast future traffic volume of 25000 vpd at Year 2032. As the volume of traffic increases over time, the $L_{A90(18hour)}$ noise level will increase correspondingly.

Indeed, it is fully expected that, by the time the future residents take up occupancy of dwellings on the 279 lots within Stages 01a, 01b, 02, 03 and 04, as well as the 400 lots (approx.) within other portions of the NDP1-1 area of Caboolture West, the volume of traffic on Caboolture River Road adjacent to the subject site will be in the range 9000-10000 vpd.

It is noted that at 2021, the road traffic volume on the section of Caboolture River Road 500m further to the east, ie between Dobson Lane and Parkridge Avenue was 7025 vpd. On this basis, by the time the dwellings within the subject site are expected to be first occupied, the volume of traffic on the section of Caboolture River Road will be comparable to the current volume of traffic on the section of Caboolture River Road approximately 500m to the east.

In simple terms, it would be reasonable to expect that the $L_{A90(18hour)}$ noise level will increase logarithmically with the increase in traffic volumes. More specifically, a doubling of the traffic volume would be expected to result in a 3dBA increase in the $L_{A90(18hour)}$ noise level. Accordingly, by the time the future residents take up occupancy of dwellings within the subject site, the $L_{A90(18hour)}$ noise level will have increased to 46.4dBA – 46.8dBA.

Notwithstanding, to gauge more accurately the likely effect of the change in $L_{A90(18hour)}$ noise levels with change in traffic volumes, a series of attended and unattended noise level measurements was conducted at Location 1 shown on Figures 6C and 6D. This location was also 13m from the edge of the road pavement. From the results of these noise level measurements and subsequent calculations, it was determined that the resultant free field $L_{A90(18hour)}$ noise level at Location 1 was 48.9dBA at 2021.

That is, on both bases, ie by simple calculation and by direct measurement elsewhere, the increase in traffic volumes will result in an increase in the $L_{A90(18hour)}$ noise levels to >45dBA, ie to a point above the limit of 45dBA $L_{A90(18hour)}$ set by DTMR under EEP.

By reference to Section 4.1.4 above, the corresponding target external noise level limit for private open spaces areas will be 60dBA $L_{10(18hour)}$ free field, ie 63dBA $L_{10(18hour)}$ facade-corrected.

## 5.2 Road Traffic Noise Model

### 5.2.1 Preparation of Road Traffic Noise Model

The prediction of road traffic noise intrusion onto the site was conducted using the CRTN '88 algorithms as applied by the SoundPLAN [XI] computer program.

The lot layout was determined from the electronic files provided by the Project Urban Designer, Urbis.

The finished ground levels across the site were established from the earthworks design provided by the Project Civil Engineers, Calibre.

The existing topographical contours surrounding the site were extracted from the MBRC Open Data Portal *DataHub* website.

At the subject site, the traffic volume, vehicle mix and road speed information for Caboolture River Road under 10 year planning horizon conditions (ie Year 2032) were set by reference to data provided by the Project Traffic Engineers, Lambert & Rehbein.

The relevant information for Caboolture River Road adjacent to the subject site is presented below.

- Traffic Volume - Eastbound (AADT): 12500vpd
- Traffic Volume - Westbound (AADT): 12500vpd
- Percentage Heavy Vehicles: 4%
- Traffic Speed: 60km/h
- Road Surface: Dense Graded Asphalt

The noise level prediction calculations also took account of the various site-specific variables and parameter settings which influence the level of road traffic noise emission onto the site. These included:-

- Site topography
- Distance from road
- Road gradients and road surfaces
- Vertical alignment of road
- Angle of view to road
- Receptor height [XII]

At the logger location M1, the predicted free field $L_{10(18hour)}$ noise level due to the actual volume of road traffic on Caboolture River Road at 2022 agreed to within 0.5dBA of the measured noise level of 63.0dBA. This degree-of-fit is well within the ±2dBA tolerance normally deemed satisfactory, ie notably by DMTR under their *Transport Noise Management Code of Practice Volume 1 – Road Traffic Noise* November 2013.

[XI] SoundPLAN is an integrated software package for noise and air pollution evaluation developed in Germany by Braunstein + Berndt GmbH. It has been configured to predict the extent of (i) road traffic noise intrusion by application of the CRTN '88 algorithms and (ii) industrial noise emission using the CONCAWE algorithms. It is in use in more than 48 countries and has had widespread application throughout Australia. It is endorsed by DTMR, MBCC, BCC, RCC, LCC, GCCC, SCRC, DESI and most other State environmental authorities.

[XII] Noise levels at ground floor level facades are determined at a receptor height of 1.6m above ground level. For first floor level facades, the receptor height is 4.2m.

### 5.2.2 Road Traffic Noise Prediction Scenarios

Under s.8.1 of SC 6.16, it is necessary to consider the impact of road traffic noise intrusion onto residential lots located within 100m of an arterial road. As can be determined from Figures 2A and 2B and, more definitively, by reference to Figures 8-11 following, there will be 25 new lots either wholly or partially located within the 100m setback zone from Caboolture River Road. These are Lots 29-53[XIII].

Four road traffic noise scenarios have been modelled.

The details of each are presented below.

Scenario 1: Receiver height set at 1.3m agl (ie occupant ear level in private open space), Caboolture River Road at 2032 traffic volume, no barriers constructed. Refer Figure 8 for noise level contours. Note: Noise level contours are presented only over those lots lying within the 100m setback zone.

Scenario 2: Receiver height set at 1.3m agl (ie occupant ear level in private open space), Caboolture River Road at 2032 traffic volume, 1.8m high acoustic barrier constructed along the southern boundaries of Lots 41-50 together with 1.8m high returns along (i) the south-western and western boundaries of Lot 50, and (ii) part of the north-western boundary of Lot 50 for a distance of 2m in a north-north-easterly direction.

Refer Figure 9 for degree of compliance achieved across the site with the 60dBA $L_{A10(18hour)}$ free field noise level limit. The alignment of the barrier arrangement is shown in Figure 12.

Notes:

1. Approved development that is to be undertaken on land adjoining to the east requires that a 1.8m high acoustic barrier be constructed along the southern boundary of Lots 680-686 (Decision Notice for Application No DA/2022/4535 refers). This barrier arrangement has been included in the assessment for the subject site.
2. As stated in Report No 21-1305.R04.Rev1, the height and alignment of the ultimate barrier to be constructed along the western boundary of Lot 50 will set by the requirement to control noise intrusion from road traffic on Caboolture River Road as well as the requirement to adequately control noise intrusion from the proposed service station development over Lot 2000 to the west. Ref. MBRC Development Application No DA/2022/1840A. As noted above in Section 4.3, however, at Condition 2 of the Decision Notice for the subject application (ie No DA/2021/4699), Council requires that the original road traffic noise report, ie Report No 21-1305.R04.Rev1, be amended to include 1.8m high barriers to Lots 51 and 52 and to the western side of the pedestrian connection to the internal District Collector Road. These barriers are those required to provide additional control noise from the Service Station and Car Wash development on Lot 2000. The barrier arrangement presented in Figure 12 includes all barriers required to be constructed to adequately control noise intrusion onto Stages 01a, 01b, 02, 03 and 04.

Scenario 3: Receiver height set at 1.6m agl (ie ground floor level facades), Caboolture River Road at 2032 traffic volume, acoustic barrier arrangement as shown in Figure 12. Refer Figure 10 for the ground floor level AS3671-1989 Construction Categories.

Scenario 4: Receiver height set at 4.2m agl (ie first floor level facades), Caboolture River Road at 2032 traffic volume, acoustic barrier arrangement as shown in Figure 12. Refer Figure 11 for the first floor level AS3671-1989 Construction Categories.

[XIII] It is noted that the incursion of 100m setback line intrudes to a very minor degree onto Lot 33. Having regard to standard building setbacks from side boundary, it is still possible that a residence constructed on this lot may lie just within the 100m setback line.

### 5.3 Discussion of Results

From the results presented in Figure 8, it can be seen that with no acoustic barriers in place, the 60dBA $L_{A10(18hour)}$ free field noise level target adopted by DTMR (and, hence, by Council) for private open spaces areas would not be met on Lots 41-50.

As shown in Figure 9, by incorporating the acoustic barrier arrangement as shown in Figure 12, full control of road traffic noise intrusion into the private open space areas across Lots 29-53 will be achieved.

With this barrier arrangement in place, the AS3671-1989 Construction Categories applying to the ground floor and first floor facades of the residential allotments located within 100m of Caboolture River Road (ie Lots 29-53) will be as shown in Figures 10 and 11, respectively.

By reference to Figure 10 (ground floor facades, with acoustic barrier shown in Figure 12 constructed), it can be seen that a Construction Category 2 designation would apply to each of Lots 29-53.

By reference to Figure 11 (first floor facades, with acoustic barrier shown in Figure 12 constructed), it can be seen that, on each of Lots 41-50, at least half of the area of the lot that lies within the standard building setbacks will be in the Construction Category 3 band. By contrast, it is evident that a Construction Category 2 designation would apply to each of each of Lots 29-40 and 51-53.

It is noted that, in Figures 8-11, the noise contours are shown extending onto Lot 54. This is an artefact of the noise modelling process. As can be seen in each of these noise control plots, Lot 54 lies outside the 100m offset line from Caboolture River Road. As a consequence, Lot 54 is not captured by the requirements of Section 8 of Council's SC 6.17 *Planning Scheme Policy – Noise*.

A summary of the Construction Categories applying to Lots 29-53 is presented below in Table 1.

| Lot | AS3671 Construction Category by Level | | Lot | AS3671 Construction Category by Level | | Lot | AS3671 Construction Category by Level | |
|---|---|---|---|---|---|---|---|---|
| | Ground Floor | First Floor | | Ground Floor | First Floor | | Ground Floor | First Floor |
| 29 | 2 | 2 | 38 | **2** | **2** | 47 | **2** | **3** |
| 30 | 2 | 2 | 39 | **2** | **2** | 48 | **2** | **3** |
| 31 | 2 | 2 | 40 | **2** | **2** | 49 | **2** | **3** |
| 32 | 2 | 2 | 41 | **2** | **3** | 50 | **2** | **3** |
| 33 | 2 | 2 | 42 | **2** | **3** | 51 | **2** | **2** |
| 34 | 2 | 2 | 43 | **2** | **3** | 52 | **2** | **2** |
| 35 | 2 | 2 | 44 | **2** | **3** | 53 | **2** | **2** |
| 36 | 2 | 2 | 45 | **2** | **3** | | | |
| 37 | 2 | 2 | 46 | **2** | **3** | | | |

**Table 1 – AS3671-1989 Construction Categories Applying to Lots 29-53**

(AS3671-1989 Construction Categories are not the same as QDC MP 4.4 Noise Categories)

### 5.4 Conclusions re Road Traffic Noise Impact

From the results of the assessment presented above in Sections 5.1, 5.2 and 5.3, the following conclusions can be drawn:-

- The acoustical design provisions of Section 8.1 of SC 6.17 *Planning Scheme Policy – Noise* apply to all residences to be constructed on lots located within 100m of the arterial section of Caboolture River Road. In this instance, this requirement will apply to 25 lots. These are Lots 29-53.
- In addition, Section 8.1 of SC 6.17 requires that road traffic noise intrusion into the designated private open space of each dwelling located within the 100m setback zone comply with DTMR's 60dBA free field noise level limit for private open spaces.
- In the absence of an acoustic barrier, the 60dBA free field noise level limit set by DTMR for private open spaces would not be met on Lots 41-50.
- By incorporating the acoustic barrier arrangement is shown in Figure 12, adequate control of road traffic noise intrusion into the private open space areas across Lots 29-53 will be achieved.

## 6.0 Assessment and Control of Noise Intrusion from Service Station and Car Wash

### 6.1 Rating Background Levels and Resultant Noise Limits

At Section 3.1 above, it was noted that SC 6.17 *Planning Scheme Policy – Noise* sets limits for acceptable levels of environmental noise emission within the Emerging Community zone on three bases. One of these is a permitted maximum exceedance of the Rating Background Level (RBL).

When assessing compliance against a noise level limit based on a permitted maximum exceedance of the RBL, the RBL value/s would usually be determined by direct monitoring of the current background noise levels over a representative period, ie usually a minimum of five days (preferred).

As noted in Report No 22-1356.R01.Rev1, monitoring of the level of noise generated by road traffic on Caboolture River Road in proximity to the site of the proposed service station and car wash was initially conducted continuously from 2:15pm Monday 18 November 2021 to 10:00am Thursday 28 November 2021.

The measurement location was 27m from the closest running lane of Caboolture River Road. The measurement height was 1.5m above ground level. The location is shown as "M2" in Figure 6B.

The noise level measurements were carried out in accordance with AS2702-1984 *Acoustics - Methods for the Measurement of Road Traffic Noise*.

Test instrumentation consisted of the following:-

- Precision sound level meter: Norsonic type Nor-139 fitted with an outdoor microphone kit
- Acoustic calibrator: ARL type ND9

Fine weather prevailed for half of the period of deployment of the noise logger. Noise level data adversely affected by wind and or rain periods was excluded from the results analysed.

The results of the monitoring for a typical fine day (ie Wednesday 20 November 2021) are presented graphically in Figure 7B.

From the unaffected logger data, the resultant free field RBL values at 2021 were determined to be as follows:-

- Day (07:00-18:00): 43dBA
- Evening (18:00-22:00): 37dBA
- Night (22:00-07:00): 31dBA

The dominant source of noise was road traffic on Caboolture River Road.

As noted above, however, the average daily volume of traffic on Caboolture River Road at 2021 was 3470vpd. Importantly, at that time, none of the residential allotments within the developments throughout the Caboolture West NDP1 area recently approved by Council or before Council for approval, or any of the developments within subsequent NDP areas, had been generated. This included the closest future residential allotments proposed to be developed immediately to the east on the opposite side of the road connecting Caboolture River Road to the E-W Arterial Road, or to the north and west of the subject site. Refer also Figure 6B.

Rather, at that time and presently, the closest residential premises were located to the south at 35-37 Ada Crescent (ie Lot 4 on RP802795), 39-41 Ada Crescent (ie Lot 5 on RP802795) and 43-45 Ada Crescent (ie Lot 6 on RP802795). Each of these residences is located on the southern side of Caboolture River Road. The closest of these residences, ie 39-41 Ada Crescent, is 98m from the southern boundary of the site.

Because none of the new residential allotments in Caboolture West had yet been generated, none of the rapid growth in traffic volumes on Caboolture River Road had commenced. Further, construction of the road connecting Caboolture River Road to the E-W Arterial Road had not begun. It is noted, of course, that future construction of the service station itself will be contingent upon the construction of the road connecting Caboolture River Road to the E-W Arterial Road.

As noted in Section 5.1.3 above, by 2032, the volume of traffic on Caboolture River Road adjacent to the site is predicted to increase to 25000 vpd with 5% HV. This is a very substantial increase in expected road traffic volumes. Correspondingly, this high rate of traffic growth will result in a rapid and sustained increase in ambient and background noise levels.

In fact, by the time houses are constructed and occupied on the new lots closest to the proposed service station and car wash, it is likely that the ambient and background noise levels will be similar to or higher than those encountered 500m to the east along Caboolture River Road, where the current (2021) traffic volume is 7025vpd.

In these circumstances, while it would be an appropriate (although somewhat conservative) approach to adopt the current (2021) RBLs when assessing the impact of noise from the proposed service station and car wash to the nearest existing residences to the south, it would not be appropriate to apply the current RBLs to the assessment of the impact of noise emission from these proposed new uses to the closest future residences.

Instead, for the future residences, the RBLs should be set by reference to other sources of information and methods better suited to this determination.

There are three methods by which this can be accomplished. These methods are explained below.

By Method 1, the RBL for each relevant time period can be determined by applying to the typical average background noise level values (ie Ave $L_{A90,T}$) offsets determined elsewhere at other similar but more heavily trafficked sites. These offsets have been derived from a large number datasets obtained from noise level logging conducted at many comparable sites.

The derived offset values (ie RBL -v- Ave $L_{A90,T}$) for Method 1 are as follows:-

- Day: -3dBA
- Evening: -2dBA
- Night: -5dBA
- Late Night (05:00-07:00): -1dBA

When applying Method 1, it is appropriate to establish the future average background noise level by reference to the schedule of average background noise levels applying under AS1055.2-1997 for the relevant noise area category. At this site, the future average background noises would be those ascribed to the Noise Area R3, ie "Areas with medium density transportation".

By Method 2, the RBL values can be determined for each relevant time period by applying the current offsets between the RBLs measured at Location M2 and the 58.3dBA $L_{A10(18hour)}$ road traffic noise level also measured at Location M2 to the $L_{A10(18hour)}$ road traffic noise level predicted to apply to the nearest residences when development of the service station and construction of the nearby future residences has been completed.

After rounding to the nearest whole decibel, the current offset values (ie RBL -v- $L_{A10(18hour)}$) for Method 2 were calculated by arithmetic subtraction to be as follows:-

- Day: -15dBA (ie 58 – 43 dBA)
- Evening: -21dBA (ie 58 – 37 dBA)
- Night: -27dBA (ie 58 – 31 dBA)
- Late Night (05:00-07:00): -15dBA (ie 58 – 43 dBA)

By Method 3, the RBL values can be determined for each relevant time period by applying the offsets between the $L_{A90,T}$ noise levels measured simultaneously at (i) Location M2 and (ii) representative locations adjoining Caboolture River Road located further to the east, ie within the established community, at Locations 1 and 2 shown in Figures 6C and 6D [XIV].

Adjusted for distance of separation from Caboolture River Road and standardised to at volume of 8000vpd (ie the volume considered to be representative of the traffic on Caboolture River Road at the time of the commencement of occupation of all the future residences on Lots 50-54) and having regard to the expected contribution to the $L_{A90,T}$ due to traffic on the yet-to-be-constructed road connecting Caboolture River Road to the E-W Arterial Road, the calculated offset values (ie Offset Ave $L_{A90,T}$ at Locations 1 & 2 -v- Ave $L_{A90,T}$ at Location M) determined by Method 3 are as follows:-

- Future Lot 50 (Day, Evening and Night): +5.3dBA
- Future Lot 51 (Day, Evening and Night): +5.1dBA

Thereafter, the RBLs to be used for the assessment of the impact on the nearest future residences can be determined as the average value of each of the RBL values derived by each of the three methods.

The results of this analysis for each of Methods 1-3 are presented overpage in Tables 2-4, respectively.

The RBL values derived in each of Tables 2-4 are restated in Table 5 together with the final set of resultant RBLs to be applied to the calculation of the noise level limit at the time of commencement of occupation of the future residences on Lots 50-54.

[XIV] On 1 and 2 February 2022, attended noise level measurements were conducted at Locations 1 and 2 concurrently with unattended noise level logging conducted over the same measurement time intervals at Location M2. The traffic volumes on Caboolture River Road at that time were 7000vpd at Location 1 and 10500 vpd at Location 2. From the results of this new set level measurements, the offsets between the ambient noise levels measured at Locations 1 and 2 and the noise levels measured at Location M2 were determined to be 4.7dBA and 10.3dBA, respectively, with a positive value indicating that the noise levels are higher at the attended location than at the unattended Location M2.

| Proposed Future Lots | Noise Area Category (ref. AS1055.2-1997) | AS1055.2-1997 Average $L_{A90,T}$, dBA | | | | Offset RBL -v- Ave $L_{A90,T}$ | | | | Derived RBL, dBA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night |
| 50 | R3 | 50 | 45 | 40 | 47 (est) | -3 | -2 | -5 | -1 | 47 | 43 | 35 | 46 (est) |
| 51-57 | R3 | 50 | 45 | 40 | 47 (est) | -3 | -2 | -5 | -1 | 47 | 43 | 35 | 46 (est) |

**Table 2 – Method 1: Rating Background Levels Derived by Reference to Average $L_{A90,T}$ Under AS1055.2-1997**

| Proposed Future Lots | Predicted Road Traffic Noise Level $L_{A10(18hour)}$, dBA | Offset RBL -v- $L_{A10(18hour)}$ | | | | Derived RBL, dBA | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night |
| 50 | 67 | -15 | -21 | -27 | -15 | 52 | 46 | 40 | 52 |
| 51-57 | 61 | -15 | -21 | -27 | -15 | 46 | 40 | 34 | 46 |

**Table 3 – Method 2: Rating Background Levels Derived by Reference to Future $L_{A10(18hour)}$ Values**

| Proposed Future Lots | Measured RBL at Location M, dBA | | | | Offset Ave $L_{A90,T}$ at Locations1 & 2 -v- Ave $L_{A90,T}$ at Location M | | | | Derived RBL at Location M, dBA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night |
| 50 | 43 | 37 | 31 | 43 | 5.3 | 5.3 | 5.3 | 5.3 | 48 | 42 | 36 | 48 |
| 51-57 | 43 | 37 | 31 | 43 | 5.1 | 5.1 | 5.1 | 5.1 | 48 | 42 | 36 | 48 |

**Table 4 – Method 3: Rating Background Levels Derived by Reference to Offsets Applied to Measured RBLs**

| Lots | Derived RBL (dBA) Table 1 | | | | Derived RBL (dBA) Table 2 | | | | Derived RBL (dBA) Table 3 | | | | Resultant RBL (dBA) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night | Day | Evening | Night | Late Night |
| 50 | 47 | 43 | 35 | 46 (est) | 52 | 46 | 40 | 52 | 48 | 42 | 36 | 48 | **49** | **44** | **37** | **49** |
| 51-57 | 47 | 43 | 35 | 46 (est) | 46 | 40 | 34 | 46 | 48 | 42 | 36 | 48 | **47** | **42** | **35** | **47** |

**Table 5 – Resultant Derived Rating Background Levels at Commencement of Occupation of Future Residences**

Adopting a conservative stance and applying the current (2021) RBLs for assessment of impact of noise emission to the closest existing residences to the south, together with the resultant RBLs presented in Table 4 for future Lots 50 and 51-57, the noise level limits applying under SC 6.17 *Planning Scheme Policy – Noise* will be shown in Table 6 below.

| Lots | $L_{Aeq\ adj,15min}$ External Noise Level Limits (dBA) (ie RBL plus 3dBA) | | | | Night Time $L_{Amax}$ External Noise Level Limit (dBA) |
|---|---|---|---|---|---|
| | Day | Evening | Night | Late Night | Average of 15 Highest |
| Closest Existing | 46 ( 43 + 3) | 40 (37 + 3) | 34 (31 + 3) | 46 ( 43 + 3) | 53 |
| 50 | 52 (49 + 3) | 47 (44 + 3) | 40 (37 + 3) | 52 (49 + 3) | 53 |
| 51-57 | 50 (47 + 3) | 45 (42 + 3) | 38 (35 + 3) | 50 (47 + 3) | 53 |

**Table 6 – Resultant External Noise Level Limits**

It is noted that, under SC 6.17, the fixed value acoustic amenity criterion for the evening time period is 45dBA $L_{Aeq\ adj,1hr}$. It is recognised that this value is numerically lower than the 47dBA $L_{Aeq\ adj,15min}$ evening external noise level limit derived to be applicable at Lot 50.

Notwithstanding, because the level of noise emission will vary during the evening time period (the 15 minute variability is commonly ±5dBA) and the compliance with the 47dBA limit needs to be achieved under the likely worst-case 15 minute period (ie when the highest level of noise emission during any one hour of the evening time period is likely to occur), it can be readily established that compliance with the 47dBA $L_{Aeq\ adj,15min}$ evening limit over any 15 minute period will be a more stringent test than compliance with the 45dBA $L_{Aeq\ adj,1hr}$ evening acoustic amenity criterion over any for one hour period, albeit only slightly so.

## 6.2 Noise Sources and Noise Level Assessment Methodology

### 6.2.1 Identified Noise Sources

From experience with other service station and car wash premises, the noise issues of relevance for this site will be as follows:-

1. Construction noise
2. Plant noise from fixed mechanical plant (ie kitchen exhaust air fans, external air-conditioning and refrigeration condensing units serving the service station shop), air compressor and ice machine
3. Noise from use of the automatic car wash bays, dog wash and the vacuum cleaners
4. Noise from motorcar movements on the site, vehicle door closures, air brake discharges
5. Noise from fuel delivery and service vehicles
6. Incidental noise from rattling of grates on driveways and caps of underground tanks, use of PA system (if any) and speech at the remote order points

Each is discussed in more detail overpage.

Construction Noise

The noise from construction activities should be controlled primarily by restricting the hours to 6:30am to 6:30pm Monday to Saturday as required by Section 440R of EP Act. Any work during the evening should be undertaken by quiet trades, eg painting, plastering, plumbing so that any noise emitted is not audible at any nearby residential premises. No construction work should be conducted between 10.00pm and 6:30am or on Sundays or public holidays.

Mechanical Plant

At present, it is planned that the external air conditioning and refrigeration condensers serving the food and drink outlet will be located in the Refuse & Services area. Ventilation fans will be located on the roof of the Fuel Store building. Pumps serving the automatic car wash bays will be located in the plant room immediately adjacent to the car wash area.

At this point, no specific selections of the mechanical plant have been made. This is quite usual for developments of this nature. In these circumstances, it is premature to attempt to quantify the actual level of noise emission from mechanical plant.

Given both (i) the distances of separation of the plant from the nearby residential premises and the acoustical shielding that will be provided by the building and boundary barriers, however, it is expected that with appropriate attention paid to the selection, installation and operation of the mechanical plant, the level of noise emitted by the mechanical plant can be readily controlled to achieve compliance with the $L_{Aeq\ adj,T}$ external noise level limits of Section 6.1 above.

Consequently, and more specifically, it will be necessary during the detailed design phase of the project to give due attention to (i) the selection and placement of the mechanical plant and (ii) the requirement for and details of any specific noise control treatments (eg construction of acoustically rated enclosures, installation of attenuators and construction of screening barriers in close proximity to air-cooled plant, as necessary) to ensure that adequate control of mechanical plant noise emission is achieved.

The specification to achieve this outcome is presented in Section 6.6 following.

Car Wash Bays and Vacuum Cleaners

In Figure 4C, it can be seen that two automatic car wash bays and a dog wash will be constructed in close proximity to the southern boundary of the site, while three car vacuum bays will be located in the SW corner of the site. The car wash and the vacuum cleaners will be coin-operated and/or credit card operated.

Acceptance of payment and, hence, use will be constrained to the period between 5:00am to 10:00pm. That is there will be no acceptance of payment and, consequently, no use during the period 10:00pm to 5:00am.

Movements of Patrons' Vehicles and Vehicle Door Closures On-Site

Whilst on-site, patrons' vehicles will be either (i) manoeuvring at low speed around, through the forecourt or through the car wash bays or (ii) stationary either at the fuel dispensing bays, the car wash bays, the vacuum bays, the air and water bay or parked in the car parking area.

Noise will be generated by motor vehicle manoeuvring movements as well as by vehicle door closures. It is fully expected that the noise generated by motorcar manoeuvring activities carried out on-site will be generally indiscernible relative to the otherwise prevailing ambient noise levels from traffic on Caboolture River Road as well as the future new roads adjoining the service station site. Notwithstanding, it is appropriate to determine by prediction the actual degree of acoustical impact.

Fuel Delivery and Service Vehicles On-Site

The fuel tanker movement pattern and the location of the delivery loading bay are shown in Figure 4C. It is noted that the tanker movement pattern differs from that proposed at the time of preparation of the original version of this report.

It is noted that to avoid vehicle movements conflicts on the site, fuel deliveries will occur at times other than times of peak patronage of the service station. Further, fuel deliveries and refuse pickups will be restricted to the day time period only (ie 7:00am to 6:00pm). General deliveries of consumables and requisites sold through the service station shop will be restricted to the time period from 5:00am to 6:00pm. There will be no sales from the service station of LPG for automotive use. Consequently, there will be no delivery of bulk LPG to the site. This does not include "SWAP'n'GO" gas bottle deliveries. There is no constraint of these gas bottle deliveries.

In these circumstances, it will be necessary to evaluate the impact of noise emission from (i) tanker truck movements during daytime off-peak period and (ii) general goods deliveries during the day time period and the final hour of the night time period, ie the late night time period.

Incidental Noise, PA Systems and Speech at Night Service Window

Incidental noise sources (ie rattling of grates on driveways and caps of underground tanks) are best controlled by ensuring that grates and caps are either bolted in place or located away from driveway/ forecourt areas.

At most service station and car washes, the use of PA systems is limited to very infrequent occasions, ie the issuing of warnings or directions to patrons. It is understood that the PA at this site will be used for warnings and directions only. At facilities where residential development is located immediately adjoining, the noise generated by use of the PA system for purposes other than issuing warnings or directions should be controlled by appropriate selection of equipment and placement and distribution of speakers so that compliance is achieved with the relevant $L_{Aeq\ adj,T}$ external noise level limits.

### 6.2.2 Methodology

To quantify the level of noise emission for the intermittent and short duration noise sources identified above in Section 6.2.1 above, a SoundPLAN [15] noise level prediction model was prepared. The noise levels emitted throughout the community were calculated using the CONCAWE [16] prediction algorithms as applied by SoundPLAN.

The inputs for the noise prediction model comprised:-

- Locations and heights of the major noise sources by reference to the drawings presented in Figures 4A-4G.
- Locations of the nearest existing receptors as shown on current aerial photographs and by direct visual inspections, with the outlines of the existing receptors determined by reference to the MBCC Open Data Portal. Note: Non-habitable buildings, ie sheds, on receptor properties have also been included.

[15] SoundPLAN is an integrated software package for noise and air pollution evaluation developed in Germany by Braunstein + Berndt GmbH. It has been configured to predict the extent of (i) industrial noise emission using the CONCAWE algorithms (with appropriate modifications for short-distance noise level predictions) and (ii) road traffic noise intrusion by application of the CRTN '88 algorithms. It is in use in more than 48 countries and has had widespread application throughout Australia. It is endorsed by Department of Environment, Science and Innovation (DESI) and most other State environmental authorities.

[16] Conservation of Clean Air and Water in Europe. The CONCAWE methods were developed under funding from European and North American groups to quantify noise prediction procedures for emission from large industrial facilities such as oil refineries and petrochemical plants. The methods were first published in 1981 in research paper CONCAWE Report No. 4/81 entitled *The Propagation of Noise from Petroleum and Petrochemical Complexes to Neighbouring Communities*. In contrast to the methods of ISO 9613-2:1996, the CONCAWE algorithms allow prediction of noise emission under calm conditions and specified stability class conditions. The CONCAWE algorithms are endorsed by DESI and most State environmental authorities.

- Nearest future receptors by reference to the current proposal plan for development over land to the east, north and west. Note: Land adjoining immediately to the south will not be developed for residential purposes. Rather, it will be preserved for drainage and open space.
- Topographical contours and cadastral information (i) for the site provided by the Project Town Planners, Urbis, and (ii) for the community to the south from the MBRC 3-D 2019 LiDAR survey.
- Topographical contours for the future development to the east, north and west as advised in the preliminary earthworks design provided by the Project Civil Engineer, with appropriate adjustments made to even out unintended ground undulations and eliminate inadvertent earthworks artefacts and anomalies.
- Source sound power levels derived from in-house data obtained at other similar sites as detailed overpage in Table 7 below.

The noise model took account of each of the following matters:-

- Source locations in 3-D space
- Frequency-dependent energy distribution of sound power levels of each major source
- Effect of attenuation due to distance between sources and receivers
- Effect of atmospheric and anomalous excess absorption
- Effect of shielding by intervening structures
- Source directivity and duration effects

| Noise Source | | Source Classification | Temporality | Sound Power Level (dBA re $10^{-12}$ W) |
|---|---|---|---|---|
| **No** | **Description** | | | |
| 1 | Car Movements – Day (Peak) | Aggregated Moving Point Source | Continuous | 104.0 |
| 1 | Car Movements – Day (Off-Peak) | Aggregated Moving Point Source | Continuous | 101.8 |
| 1 | Car Movements – Evening | Aggregated Moving Point Source | Continuous | 99.6 |
| 1 | Car Movements – Night | Aggregated Moving Point Source | Continuous | 97.8 |
| 2 | Tanker Movement – Engine | Single Moving Point Source | Continuous | 108.0 |
| 3 | Tanker Movement – Exhaust | Single Moving Point Source | Continuous | 108.0 |
| 4 | Airbrake Blowdown | Stationary Point Source | Instantaneous | 108.5 |
| 5 | Car Door Closures | Stationary Point Source | Instantaneous | 94.0 |
| 6 | Truck Door Closures | Stationary Point Source | Instantaneous | 94.6 |
| 7 | Tyre Inflation Alarm | Stationary Point Source | Very short duration | 94.0 |
| 8 | Car Wash – Wash Cycle (Roll door Open) | Stationary Point Source | Intermittent | 89.0 |
| 8 | Car Wash – Wash Cycle (Roll door ¾ Closed) | Stationary Point Source | Intermittent | 83.0 |
| 9 | Car Wash – Blower Dryer Cycle (Roll door Open) | Point Source Moving over Short Distance | Intermittent | 94.0 |
| 9 | Car Wash – Blower Dryer Cycle (Roll door ¾ Closed) | Point Source Moving over Short Distance | Intermittent | 88.0 |
| 10 | Dog Wash | Stationary Point Source | Intermittent | 83.2 |
| 11 | Car Wash Vacuum Cleaner | Stationary Point Source | Intermittent | 82.5 |

**Table 7 – Source Sound Power Levels**

Note re sound power levels:

> The source sound power levels as presented in Table 7 above for the moving point sources and the car wash appliances take account of (i) the sound power level of the source itself as well as the temporal parameters, ie (ii) duration of the event and (iii) number of events in the assessment time interval.

Further Notes:

1. For each of the relevant time periods, the likely worst-case operating scenario has been assessed. Based on experience with many other service station and car washes, it is fully expected that there will be a higher volume of car movements on the site and greater patronage of the car wash and vacuum cleaner bays during the day time period relative to the movements and patronage during the evening period (ie 18:00 to 22:00) and the late night time period (ie from 05:00 to 07:00).

   Notwithstanding the lower patronage the evening and night, it is noted that the limits for acceptable levels of noise emission during the evening time period and the full night time period are more stringent than those during the day. As a result, it is necessary to consider the likely worst-case conditions prevailing during the evening time and night time periods. For completeness, the likely worst-case conditions prevailing during the late night time period are also required to be assessed.

2. For motorcar movements which generate more than one occurrence per 15 minute period, ie more than one noise event per 15 minute period, it is also necessary to make the appropriate adjustment for the number of events.

3. The source sound power level adopted for tanker movement and car door closures are the same as those sound power levels adopted for the original assessment conducted in April/May 2022. From the results of more recent noise level testing and sound power level data reviewed in the interim, however, it is evident that the sound power levels presented in Table 7 for these noise sources are relatively conservative. Notwithstanding, to maintain consistency with the original assessment, no adjustments to the source sound power levels have been made. Consequently, the predicted noise levels shown in the noise contour plots presented in Figures 14, 20 and 20A would be expected to result in a moderate overstatement of the actual degree of noise intrusion into the community.

4. Noise from car parking and loading bays/service vehicle activity is usually best quantified using the higher order statistical noise level parameters, ie $L_{Amax}$, $L_{A01,T}$ and $L_{A10,T}$. Given the reasonably predictable nature of the movement of individual service vehicles, and to a lesser degree, the movements of individual motorcars, it is possible to make a reasonable determination of the level of noise generated using the $L_{Aeq\ adj,15min}$ parameter for these vehicles.

   Further, given that (i) the most stringent noise level limits are those that apply at night and (ii) noise emission from motor vehicles in the carpark at night (notably the noise of car door closures) has the potential to adversely affect sleep amenity, and as required by SC 6.17, it is necessary to determine also the $L_{Amax}$ noise levels due to motor vehicles in the car parking bays and at the air and water bay during the night time period.

5. After adopting a constraint on the operation for the ancillary car wash elements of the proposed development to 17 hours a day (ie 05:00-22:00), it was determined that to achieve adequate control of noise emission from the activities associated with the Service Station and Car Wash, it would be necessary to complement the 1.8m high acoustic barrier arrangement presented in Figure 12 with an additional acoustic barrier 2.0m-2.4m high along the southern boundary of Lot 2000. The additional acoustic barrier arrangement is shown in Figure 13. As noted in Section 2.2, this additional barrier arrangement has been incorporated in the current design of the Service Station and Car Wash facility.

6. Finally, it is noted that in both the original design of the car wash facility and the design presented in the proposal current at the time of the preparation of first revision of this noise report (ie at November 2023) both car wash bays were proposed to be operated manually with cleaning carried out by use of soap and pressure spray wands. By contrast, the current proposal is for two automatic car wash bays, each of which will incorporate a blower dryer phase within the car wash cycle. Higher levels of noise are generated by blower dryers than by soap and pressure spray wands. In fact, during the acoustical evaluation process, it was determined that there was potential for the level of noise generated by the blower dryer phase to result in excessive levels of noise emission, especially during the evening time period. Notwithstanding, and as is frequently the case at existing automatic car wash facilities located in proximity to residential development, a solid panel roll door can be installed to the entry side of each automatic car wash, with the door closed – at least partially – to control both spray drift and noise emission. Refer also further discussion at Sections 6.4 and 7.2 following.

## 6.3 Results of Assessment of Impact of Noise from Service Station and Car Wash

The results of the acoustical assessment are presented as a set of noise contour plots as detailed overpage in Table 8.

Notes:

Vehicle movement paths during the typical worst-case 15 minute periods are shown as cyan lines on the noise contour plots, while point source levels are shown as cyan asterisks.

The "A" figures (ie 17A, 21A, 22A and 23A) are cut-down versions of Figures 17, 21, 22 and 23, respectively. The "A" figures show directly the degree of compliance achieved against the relevant noise level limits which, in Tables 8 and 9 following, have been shown colour-coordinated to the contours in the "A" figures.

For the results presented in Figures 18-23A, it was assumed that a solid panel roll door was fitted to the entry side of each of the automatic car wash bays, with the roll door operated such that at least ¾ of the car wash bay opening was closed with only the bottom ¼ remaining open to outside.

| Figure | Time Period | Noise Source | Noise Level Parameter | Noise Level Limit, dBA | | |
|---|---|---|---|---|---|---|
| | | | | Existing Residences | Lot 50 | Lots 51-57 |
| 14 | Day (Peak) | Movements of Patrons' Vehicles | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 15 | Day (Off-Peak) | Movements of Patrons' Vehicles, Fuel Tanker and Delivery Truck | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 16 | Evening | Movements of Patrons' Vehicles | $L_{Aeq\ adj,15min}$ | 40 | 47 | 45 |
| 17 | Night | Movements of Patrons' Vehicles | $L_{Aeq\ adj,15min}$ | 34 | 40 | 38 |
| 17A | Night | Movements of Patrons' Vehicles | $L_{Aeq\ adj,15min}$ | 34 | 40 | 38 |
| 18 | Day | Car Wash Operations | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 19 | Evening | Car Wash Operations | $L_{Aeq\ adj,15min}$ | 40 | 47 | 45 |
| 20 | Late Night | Car Wash Operations | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 21 | Day (Off-Peak) | Movements of Patrons' Vehicles Fuel Tanker and Delivery Truck and Car Wash Operations | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 21A | Day (Off-Peak) | Movements of Patrons' Vehicles Fuel Tanker and Delivery Truck and Car Wash Operations | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 22 | Evening | Movements of Patrons' Vehicles and Car Wash Operations | $L_{Aeq\ adj,15min}$ | 40 | 47 | 45 |
| 22A | Evening | Movements of Patrons' Vehicles and Car Wash Operations | $L_{Aeq\ adj,15min}$ | 40 | 47 | 45 |
| 23 | Late Night | Movements of Patrons' Vehicles, General Deliveries and Car Wash Operations | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 23A | Late Night | Movements of Patrons' Vehicles, General Deliveries and Car Wash Operations | $L_{Aeq\ adj,15min}$ | 46 | 52 | 50 |
| 24 | Night | Tyre Inflation Alarm, Vehicle Door Closures (plus General Deliveries 05:00-07:00) | $L_{Amax,,15min}$ | 53 | 53 | 53 |

**Table 8 – Key to Noise Contour Plots**

### 6.4 Discussion of Results

To assist in interpretation of the results presented in Figures 14-24, the maximum predicted level of noise emission into the community, ie at the most affected residences (not sheds), due to the activities of the service station and car wash (including dog wash) for each of the operating conditions assessed has been derived from the noise contour plots presented in these figures.

The results, rounded to the nearest whole decibel, together with the applicable noise level limits, are presented in Table 9 below.

| Fig No | Time Period | Noise Source | Emitted Noise Level, dBA | | | Noise Level Limit, dBA | | | Complies with Limits? |
|---|---|---|---|---|---|---|---|---|---|
| | | | Exist Res. | Lot 50 | Lots 51-57 | Exist Res. | Lot 50 | Lots 51-57 | |
| 14 | Day (Peak) | Patrons' Vehicles | <32 | <32 | 33 | 46 | 52 | 50 | Yes |
| 15 | Day (Off-Peak) | Patrons' Vehicles, Tanker and Truck | 37 | 44 | 46 | 46 | 52 | 50 | Yes |
| 16 | Evening | Patrons' Vehicles | <27 | <27 | 28 | 40 | 47 | 45 | Yes |
| 17 | Night | Patrons' Vehicles | <20 | 24 | 27 | 34 | 40 | 38 | Yes |
| 17A | Night | Patrons' Vehicles | <20 | 24 | 27 | 34 | 40 | 38 | Yes |
| 18 | Day | Car Wash Ops | 35 | 40 | 41 | 46 | 52 | 50 | Yes |
| 19 | Evening | Car Wash Ops | 31 | 37 | 40 | 40 | 47 | 45 | Yes |
| 20 | Late Night | Car Wash Ops | <33 | 37 | 41 | 46 | 52 | 50 | Yes |
| 21 | Day (Off-Peak) | Patrons' Vehicles, Tanker and Truck | 39 | 45 | 48 | 46 | 52 | 50 | Yes |
| 21A | Day (Off-Peak) | Patrons' Vehicles, Tanker and Truck | 39 | 45 | 48 | 46 | 52 | 50 | Yes |
| 22 | Evening | Patrons' Vehicles and Car Wash Ops | 31 | 38 | 41 | 40 | 47 | 45 | Yes |
| 22A | Evening | Patrons' Vehicles and Car Wash Ops | 31 | 38 | 41 | 40 | 47 | 45 | Yes |
| 23 | Late Night | Patrons' Vehicles, General Deliveries and Car Wash Ops | 39 | 42 | 41 | 46 | 52 | 50 | Yes |
| 23A | Late Night | Patrons' Vehicles, General Deliveries and Car Wash Ops | 39 | 42 | 41 | 46 | 52 | 50 | Yes |
| 24 | Night | Tyre Inflation Alarm, Vehicle Door Closures (plus General Deliveries 05:00-07:00) | 41 | 49 | 48 | 53 | 53 | 53 | Yes |

**Table 9 – Summary of Results and Degree of Compliance with Noise Level Limits**

From the results presented in Figures 14-24 and as summarised above in Table 9 directly above, it can be seen that, provided (i) the hours of operation of the car wash are limited to the period from 5:00am to 10:00pm, (ii) the hours for service and delivery vehicle movements are restricted as described in Section 6.2.1 above and (iii) a fast-acting solid panel roll door is fitted to the entry side of each of the automatic car wash bays, with the roll door operated so that at least ¾ of the car wash bay opening is closed, the level of noise emission from the activities at the service station and car wash will achieve compliance with the applicable noise level limits during all relevant operating time periods.

Importantly, it should be noted that, as requested by Council in the Information Request issued on 16 June 2022 (refer also Section 4.2.2 above ), it has been determined that, if the hours of operation of the ancillary car wash elements of the proposed development are reduced from 24 hours per day to the period from 5:00am to 10:00pm only, (i) the height of the barrier to Lots 50-52 formerly recommended to be constructed in Report No 21-1356.R01 (May 2022) could be reduced to 1.8m and (ii) the barrier to Lots 53-54 eliminated in entirety.

### 6.5 Fixed Mechanical Plant Serving Service Station and Car Wash

As noted above in Section 6.2.1, it is premature to attempt to quantify the actual level of noise emission from mechanical plant, notably the ventilation fans and the air conditioning and refrigeration condensing units serving the Fuel Store building. In these circumstances, it is necessary to set a specification for acceptable levels of noise emission from the mechanical plant as well as the communication equipment.

In addition, during the detailed design phase of this development due consideration should be given to (i) the selection and placement of the mechanical plant and (ii) the requirement for and details of any specific noise control treatments (eg construction of acoustically rated enclosures, installation of attenuators and construction of screening barriers in close proximity to air-cooled plant, as necessary) to ensure that adequate control of mechanical plant noise emission is achieved in order that the noise level limits can be met.

Having regard to standard practice, it would be appropriate to condition the approval to require that the specification presented below be applied.

<u>Noise from Mechanical Plant</u>

When measured externally at the most exposed facade of any nearby residence, the <u>component</u> sound pressure level, $L_{Aeq\ adj,15min}$, due to operation of all fixed mechanical plant and equipment serving all elements of the Fuel Store building (ie roof-mounted and ground-mounted plant) and the ancillary car wash elements of the development (ie plant within the 27m² plant room adjacent to the car wash bays) should not exceed the following noise level limits:-

- Day (ie 07:00-18:00): Background noise level +3 dBA
- Evening (ie 18:00-22:00): Background noise level +3 dBA
- Night (22:00-07:00): Background noise level +0 dBA

To assist in achieving compliance with the specification at each of the nearby residential locations, it would be appropriate to have regard to the schedule of derived RBL values presented in Table 5 above.

### 6.6 Conclusions re Impact of Noise from Service Station and Car Wash

From the results of the assessment presented above, the following conclusions can be drawn:-

Construction Noise

As discussed above in Section 6.2.1, the noise from construction activities should be controlled primarily by restricting the hours to 6:30am to 6:30pm Monday to Saturday as required by Section 440R of EP Act. Any work during the evening should be undertaken by quiet trades (eg painting, plastering, plumbing) so that any noise emitted is not audible at any nearby residential premises. No construction work should be conducted between 10.00pm and 6:30am or on Sundays or public holidays.

Movements of Patrons' Vehicles and Operation of Car Wash

Full control of the level of noise emission from the movements of patrons' vehicles on the site and operation of the car wash has been predicted to be achieved for all time periods provided (i) fuel deliveries and refuse pickups are restricted to the day time period only (ie 7:00am to 6:00pm), (ii) general deliveries of consumables and requisites sold through the service station shop are restricted to the time period from 5:00am to 6:00pm, (iii) use of the car wash and dog wash is constrained to the period between 5:00am and 10:00pm, (iv) a fast-acting solid panel roll door is fitted to the entry side of each of the automatic car wash bays, with the roll door operated such that when the vehicle is being washed, at least ¾ of the car wash bay opening is closed leaving only the lower ¼ open to outside, (v) the barrier arrangements shown in both Figures 12 and 13 are implemented and (vi) there are no deliveries to the site of bulk LPG for automotive use.

Car Door Closures and Use of Air and Water Bay during Night Time Period

Full control of the level of noise emission from car door closures and use of the air and water bay during the night time period will be achieved provided the barrier arrangements shown in both Figure 12 and Figure 13 are implemented.

Incidental Noise, PA Systems and Speech at Night Service Window

As discussed above in Section 6.2.1, incidental noise sources (ie rattling of grates on driveways and caps of underground tanks) are best controlled by ensuring that grates and caps are either bolted in place or located away from driveway/forecourt areas.

It is understood that it is intended that the PA at this service station and car wash will be used only very infrequently and, even then, only to issue specific warnings to patrons or directions to patrons. Under these circumstances of safety, it will not be necessary to establish compliance with the $L_{Aeq\ adj,T}$ external noise level limits of Table 8 above.

# 7.0 Recommendations

## 7.1 Control of Road Traffic Noise Intrusion

As required by Conditions 2 and 4 of Decision Notice for Application No DA/2021/4669 and to adequately control road traffic noise intrusion into the proposed residential allotments, it is recommended that the barrier arrangement shown in Figure 12 be constructed. This barrier is to be 1.8m high and constructed along the following boundaries:-

(i) Southern boundaries of Lots 41-50, plus

(ii) Four truncation chords of boundary at the south-western corner of Lot 50, plus

(iii) Remainder of the western boundary of Lot 50, plus

(iv) Western boundary of the pedestrian connection to the Internal District Collector Road, plus

(v) Western boundaries of Lot 51 and 52.

SC 6.17 *Planning Scheme Policy – Noise* does not provide specifications for the design and/or construction of acoustic fences. Notwithstanding, guidance on the appropriate design specifications and construction requirements can be drawn from (i) Council's Standard Drawing No SF-1520 for typical construction details of post and paling acoustic barriers and (ii) Council's Standard Drawing No SF-1521 for typical construction details of post and board acoustic barriers.

To ensure that adequate control of road traffic noise intrusion into the habitable spaces of any dwellings located on Lots 29-53 is achieved, the particular dwellings should be designed and constructed in accordance with AS3671-1989 *Acoustics – Road traffic noise intrusion - Building siting and construction* to achieve compliance with the internal sound levels of AS/NZS 2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors*.

It is noted that this requirement has been adopted in Property Note DS08 of Decision Notice for Application No DA/2021/4669, albeit inadvertently including Lot 54 (which lies beyond 100m from Caboolture River Road) as well.

## 7.2 Control of Noise Intrusion from Service Station and Car Wash

To achieve adequate control of noise emission due to the relevant noise sources and to address any reverse acoustical amenity issues, it is recommended that the following noise control actions be implemented:-

1. Adopt the current design shown in the Architect's drawings (refer Figures 4A-4H attached).

2. Restrict fuel deliveries and refuse pickups to the day time period only (ie 7:00am to 6:00pm).

3. Restrict general deliveries (ie deliveries of consumables and requisites that are sold through the service station shop) to the time period from 5:00am to 6:00pm only.

4. Restrict use of the car wash to the period from 5:00am to 10:00pm daily.

5. Install a fast-acting solid panel roll door to the entry side of each of the automatic car wash bays, with the roll door operated such that when the vehicle is being washed, at least ¾ of the car wash bay opening is closed leaving only the lower ¼ open to outside. Refer also Figure A overpage showing a typical installation. Note: In some installations, the panels in the door have been constructed using fine mesh as a means of simply controlling discharge of spray. For the subject application however, it will be necessary for the panels to be solid (ie without openings) and constructed using sheet material achieving minimum superficial density of 3.5 kg/m².


**Figure A – Automatic Car Wash Fitted With Fast-Acting Solid Panel Roll door to Entry Side of Car Wash Bay (Source: StreetView)**

6. Preclude bulk LPG deliveries (ie LPG for automotive use) to the site.

7. To control noise emission to the existing residences to the south, construct along the southern boundary of Lot 2000 the 2.0m-2.4m high barrier arrangement shown in Figure 4C (Ground Floor Plan prepared by Thomson Adsett) as well as in Figure 13, both attached.

   Notes:

   The barrier shown in Figure 13 is required simply to address noise emission to the south. Full control of noise emission from the Service Station and Car Wash to the future residences of Stages 01a, 01b, 02, 03 and 04 of Lilywood Landings Estate will be achieved by the erection of the barrier arrangement shown in Figure 12.

   Guidance on the appropriate design specifications and construction requirements for the barrier shown in Figure 13 can be drawn also from (i) Council's Standard Drawing No SF-1520 for typical construction details of post and paling acoustic barriers and (ii) Council's Standard Drawing No SF-1521 for typical construction details of post and board acoustic barriers, with appropriate modifications made to address the specific structural design requirements of a barrier 2.4m high.

8. Select and install mechanical plant to achieve compliance with the following noise level specification.

   When measured externally at the most exposed facade of any nearby residence, the component sound pressure level, $L_{Aeq\ adj,15min}$, due to operation of all fixed mechanical plant and equipment serving all elements of the Fuel Store building and the ancillary car wash elements should not exceed the following noise level limits:-

   - Day (ie 07:00-18:00): Background noise level +3 dBA
   - Evening (ie 18:00-22:00): Background noise level +3 dBA
   - Night (22:00-07:00): Background noise level +0 dBA

9. Ensure all grates and caps are either bolted in place or located away from driveway/forecourt areas.

10. Ensure that the PA system at the site is to be used for safely purposes, ie to issue warnings or directions to patrons.

## 8.0 Final Note

If, in addressing the requirements of Conditions 2 and 4, it were deemed necessary to simplify the barrier construction requirements, then rather than constructing the barriers in two phases (ie the barrier arrangement shown in Figure 12 followed by the barrier arrangement shown in Figure 13), both barrier arrangements may be constructed together.

We trust that this information is adequate for your purposes at this stage, but should you require any further information, please do not hesitate to contact us.

Report prepared by:

Russell Brown,
Director, Acoustics RB Pty Ltd
RPEQ 2799


**Figure 1 – Location of Lilywood Landings Estate (Shown with Red Outlines)**

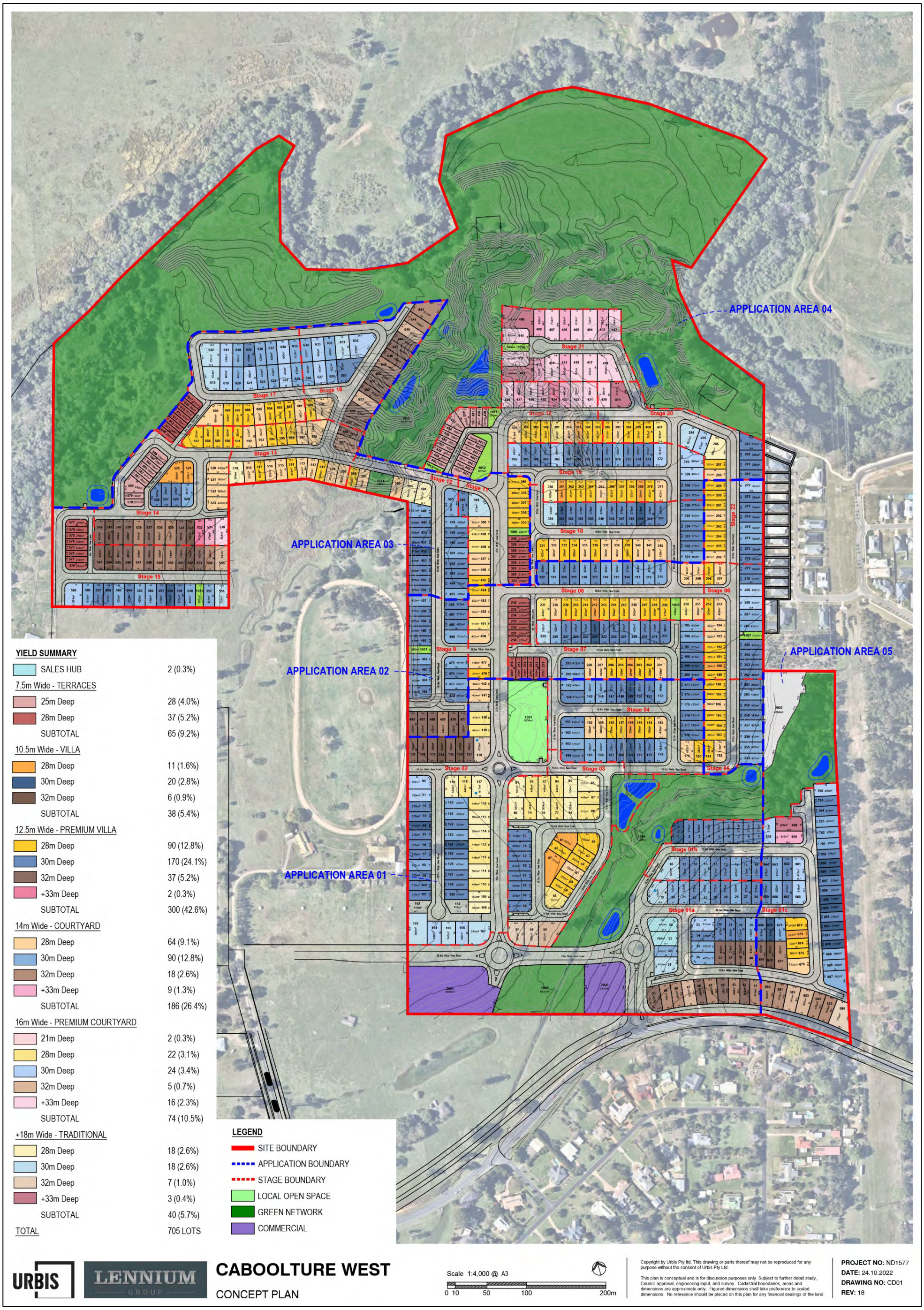



**Figure 2A – Concept Plan (Stages 01a, 01b, 02, 03 and 04 Shown Outlined in Blue)**


**Figure 2B – Approved Reconfiguration of Lot – Application 1 (Stages 01a, 01b, 02, 03 and 04 Shown Outlined in Dashed Navy)**


**Figure 3A – Site Location (Lot 2000), Nearby Existing Residences and Location of Noise Logger "M1"**

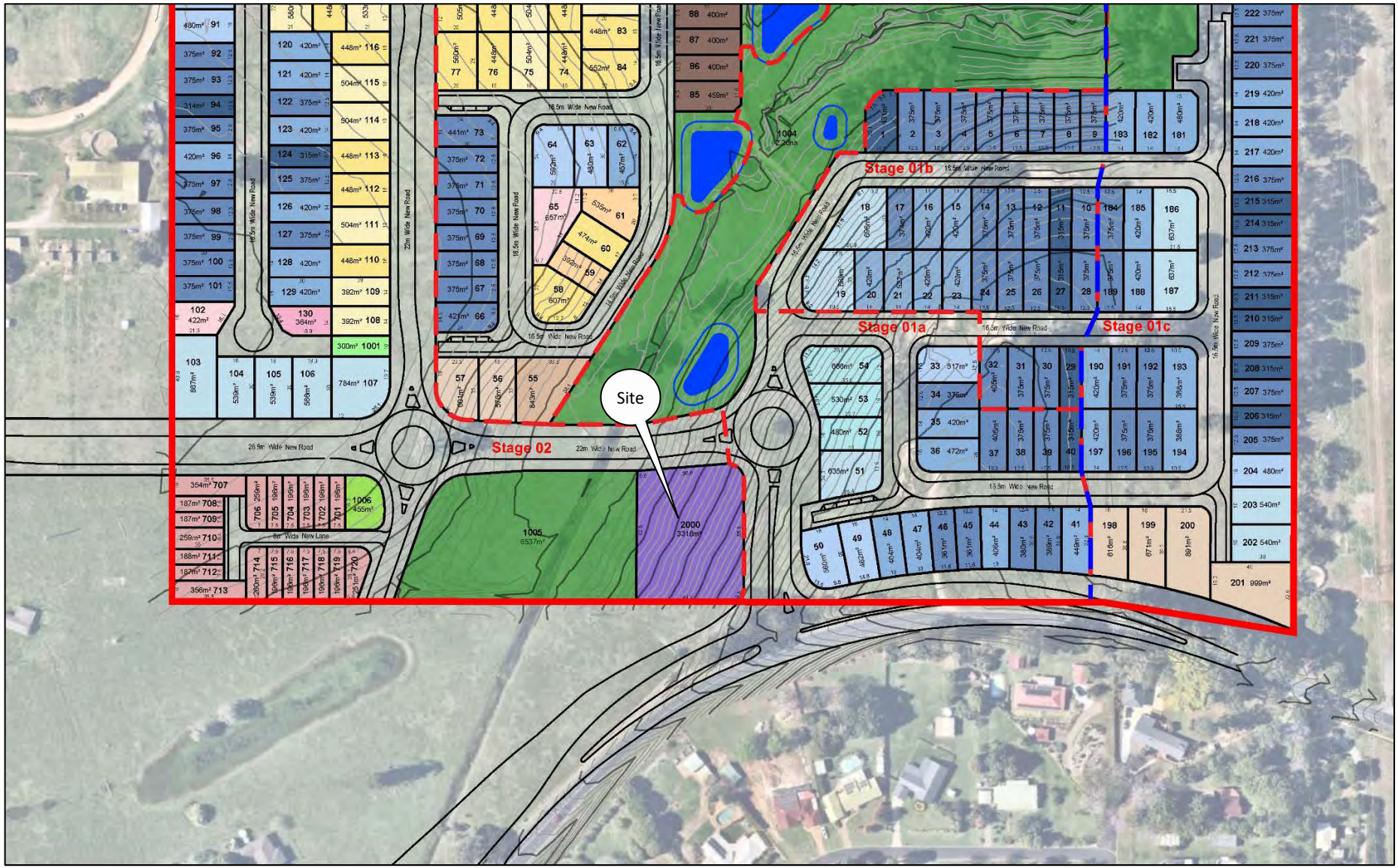



**Figure 3B – Site Location and Nearby Future Lots**

**(Extract from proposal plan for development over land to east, north and west)**

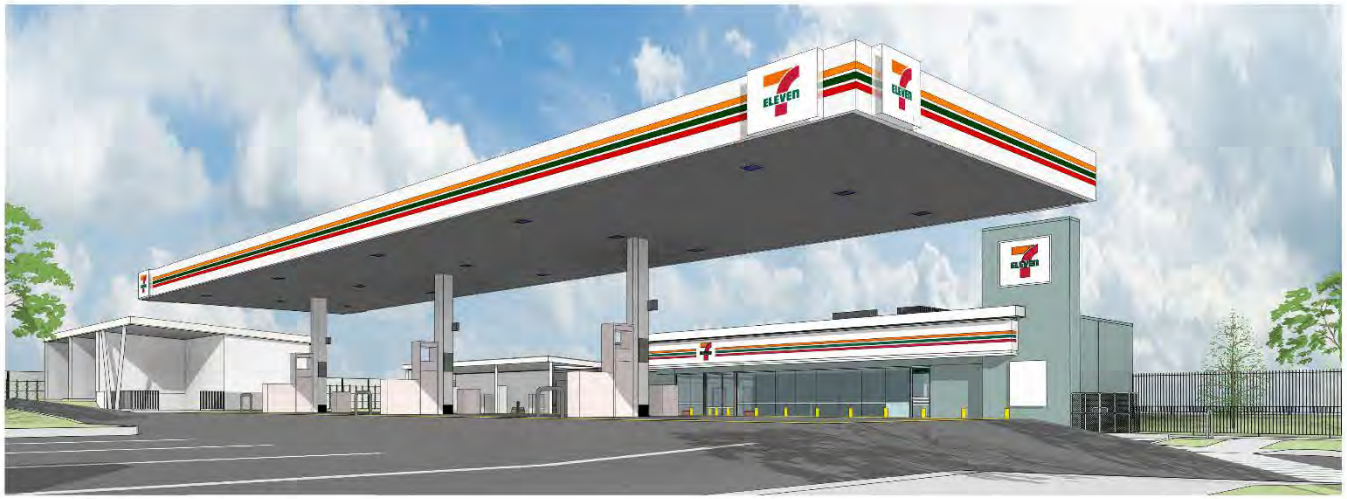
# CABOOLTURE WEST SERVICE CENTRE

LOT 2000 CABOOLTURE WEST ESTATE

**DRAWING LIST - CONCEPT**

| | | |
|---|---|---|
| A- | 0.00 | COVER SHEET |
| A- | 1.01 | SITE PLAN |
| A- | 2.01 | GROUND FLOOR PLAN |
| A- | 3.01 | SITE ELEVATIONS - SHEET ONE |
| A- | 3.02 | SITE ELEVATIONS - SHEET TWO |
| A- | 3.03 | BUILDING ELEVATION & SECTIONS |
| A- | 9.01 | SITE AXONOMETRIC VIEWS |
| A- | 9.11 | SITE PERSPECTIVE VIEWS |


1 SITE CONTEXT PLAN
1 : 7500




2 3D VIEW - PROPOSED DEVELOPMENT

PRELIMINARY

CABOOLTURE WEST SERVICE CENTRE
LOT 2000 CABOOLTURE WEST ESTATE


ABN 76 105 314 654
Dimensions take precedence over scaling. Do not measure off drawings as print sizes may vary

Telephone +61 7 3840 9999
bne@thomsonadsett.com
Level 9, 470 St Pauls Terrace
Fortitude Valley

thomson adsett

COVER SHEET
1 : 7500 @ A1
2024-03-07

**Figure 4A – Site Context**


**PROPERTY DETAILS**

| | |
|---|---|
| PROPERTY DESCRIPTION: | PROPOSED FUEL STATION & CAR WASH |
| SITE AREA: | 3196.5m² |
| PROPERTY ADDRESS: | LOT 2000 CABOOLTURE WEST ESTATE |

**AREA SCHEDULE - GFA**

| AREA NAME | GFA |
|---|---|
| FUEL STORE | 194 m² |

**SITE COVER**

| TYPE | AREA | % OF DEVELOPMENT SITE COVERAGE |
|---|---|---|
| SITE COVER (NOT ROOFED) | 2556 m² | 77% |
| SITE COVER (ROOFED) | 762 m² | 23% |
| TOTAL | 3318 m² | 100% |

**SITE AREA**

| SURFACE TYPE | AREA | % OF DEVELOPMENT SITE COVERAGE |
|---|---|---|
| IMPERVIOUS | 2648 m² | 80% |
| LANDSCAPE | 670 m² | 20% |
| TOTAL | 3318 m² | 100% |

PRELIMINARY

CABOOLTURE WEST SERVICE CENTRE
LOT 2000 CABOOLTURE WEST ESTATE



Telephone +61 7 3840 9999
bne@thomsonadsett.com
Level 9, 470 St Pauls Terrace
Fortitude Valley

thomson adsett

SITE PLAN
1 : 250 @ A1
2024-03-07

**Figure 4B – Site Plan**

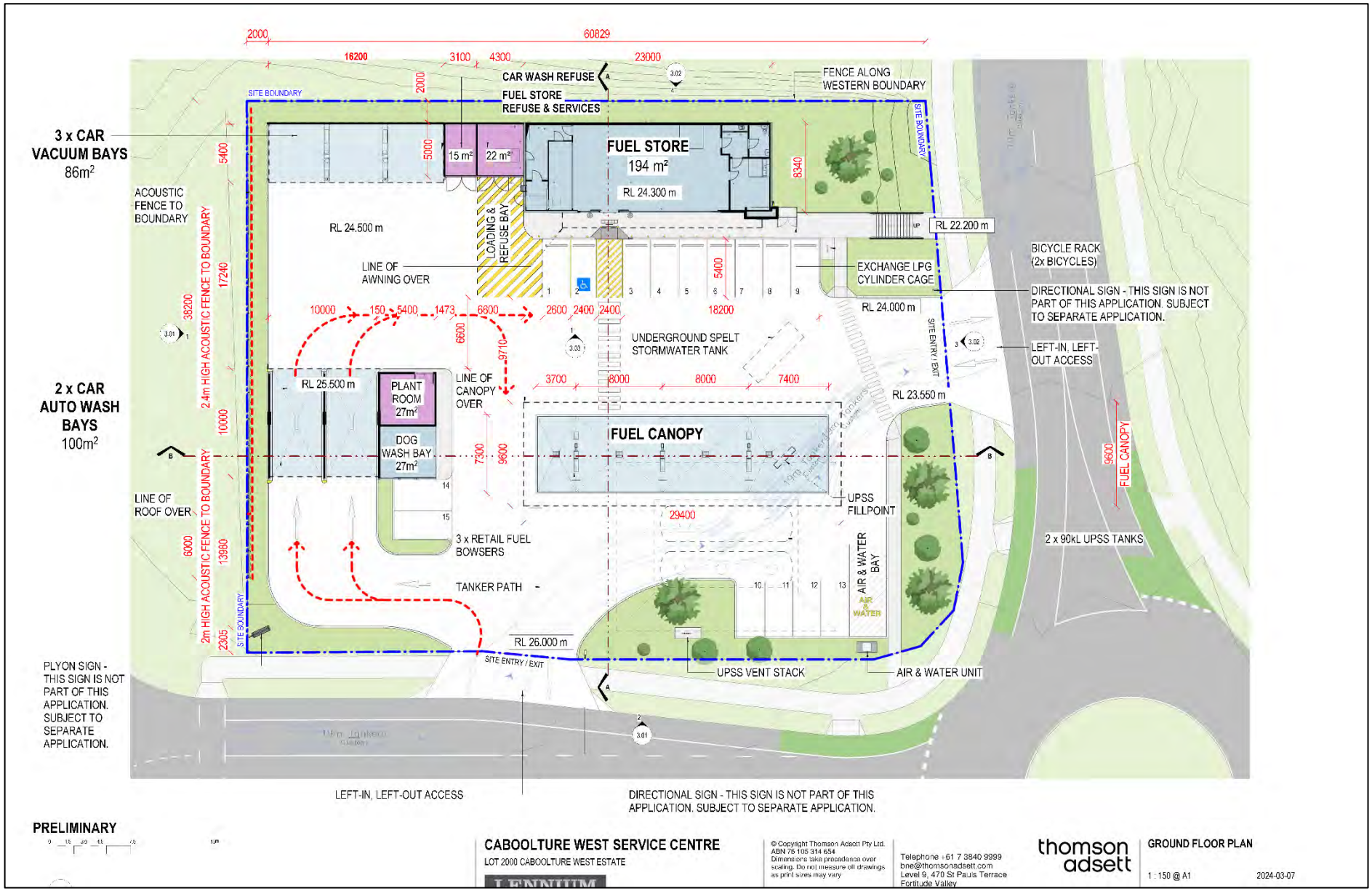



**Figure 4C – Ground Floor Plan**

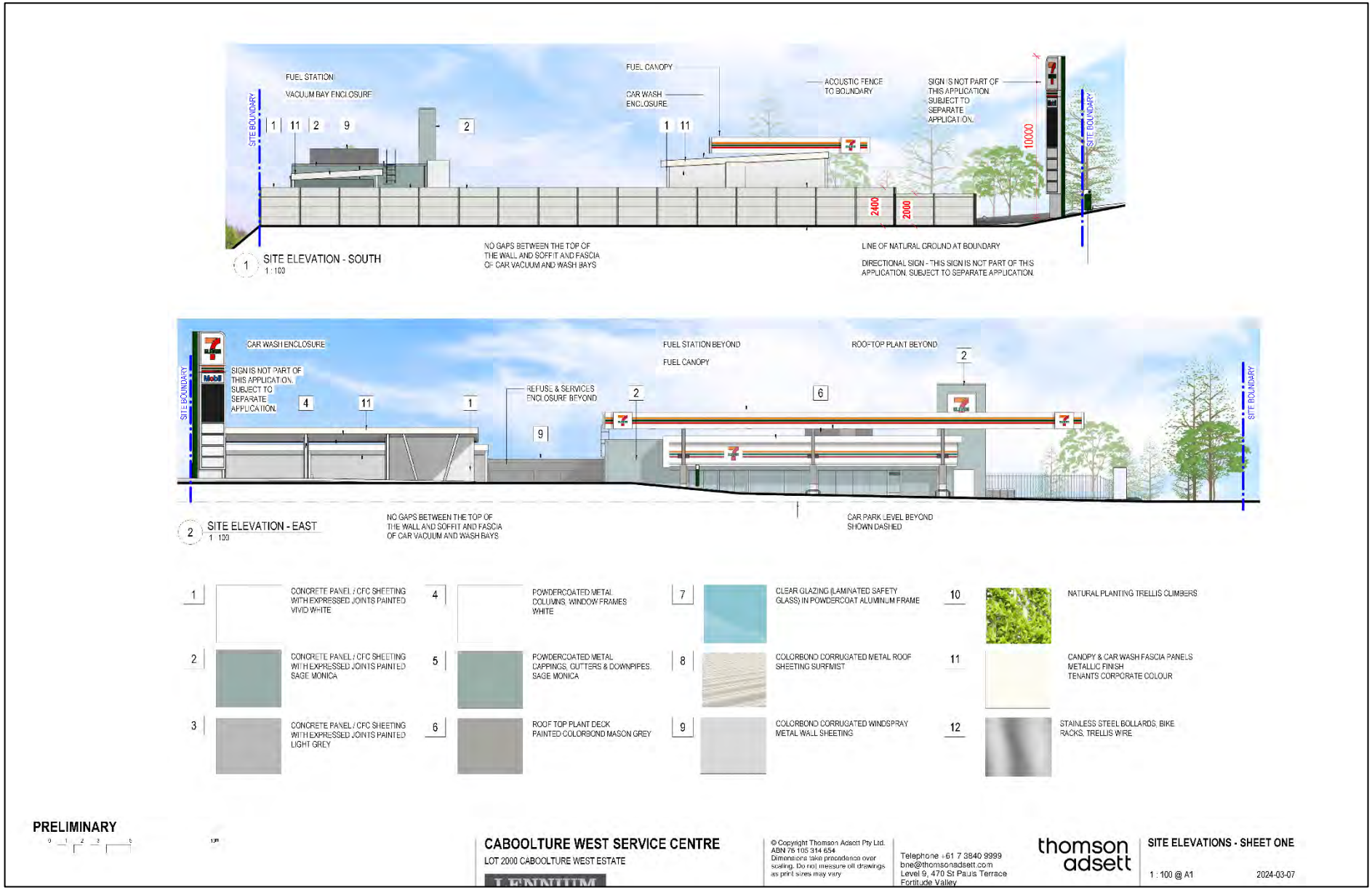



**Figure 4D – Building Elevations Sheet 1**

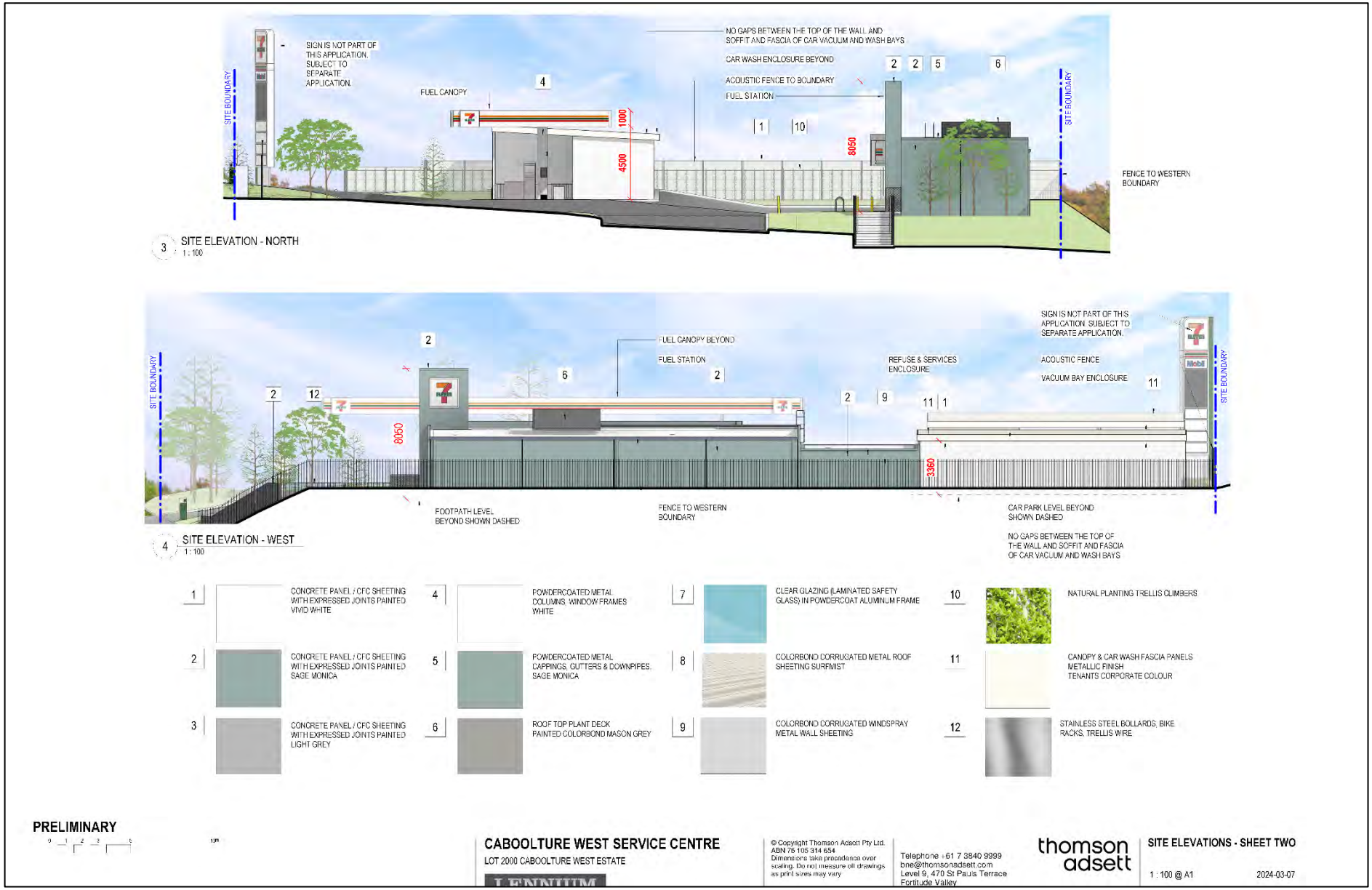



**Figure 4E – Building Elevations Sheet 2**

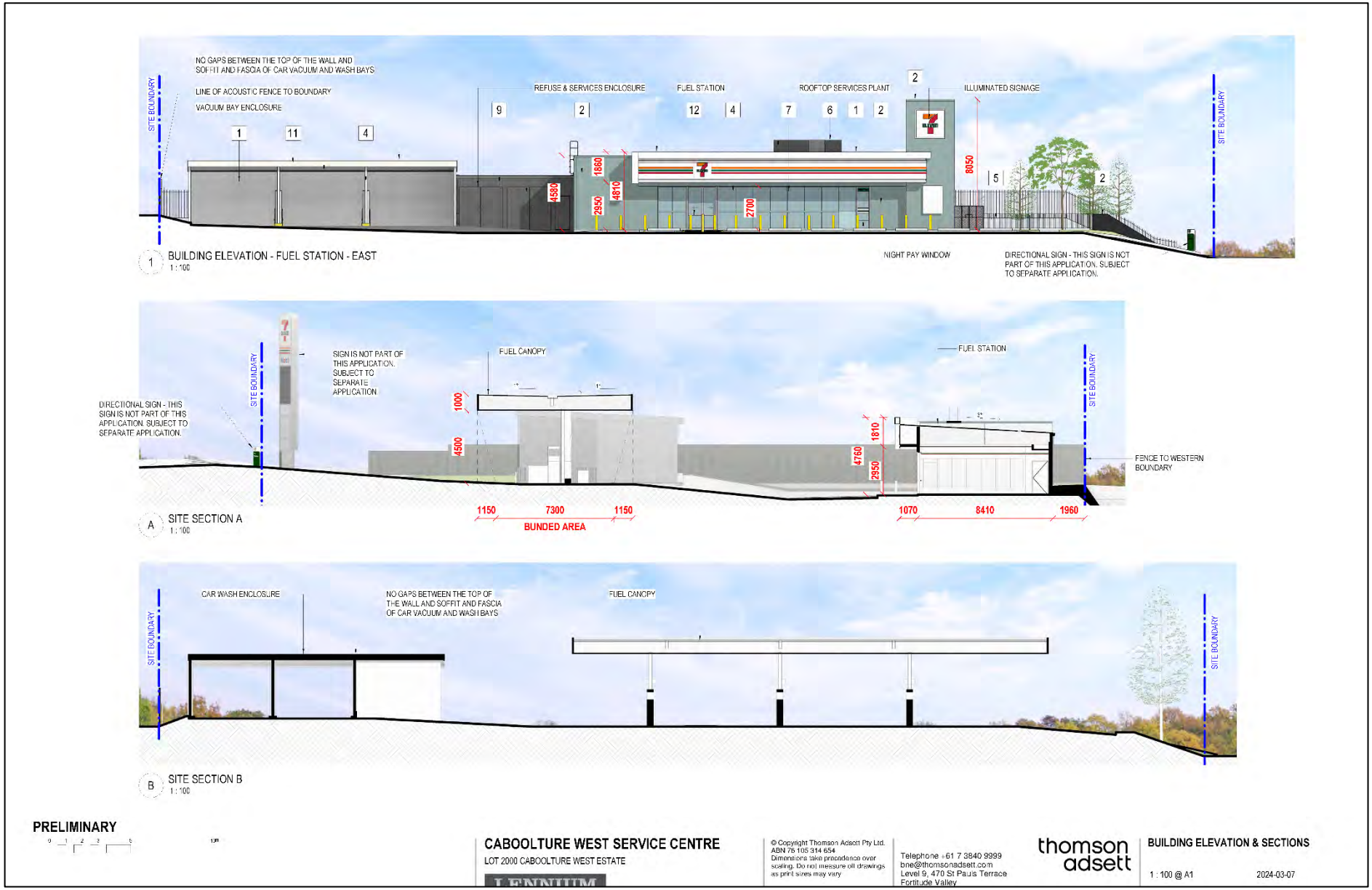



**Figure 4F – Building Elevations and Sections**

1 3D AXONOMETRIC VIEW 1

2 3D AXONOMETRIC VIEW 2

PRELIMINARY

CABOOLTURE WEST SERVICE CENTRE
LOT 2000 CABOOLTURE WEST ESTATE



Telephone +61 7 3840 9999
bne@thomsonadsett.com
Level 9, 470 St Pauls Terrace
Fortitude Valley

thomson adsett

SITE AXONOMETRIC VIEWS

@ A1 2024-03-07

**Figure 4G – 3D Axonometric Views**

1 3D VIEW ONE

2 3D VIEW TWO

3 3D VIEW THREE

4 3D VIEW FOUR

PRELIMINARY

CABOOLTURE WEST SERVICE CENTRE
LOT 2000 CABOOLTURE WEST ESTATE



Telephone +61 7 3840 9999
bne@thomsonadsett.com
Level 9, 470 St Pauls Terrace
Fortitude Valley

thomson adsett

SITE PERSPECTIVE VIEWS

@ A1 2024-03-07

**Figure 4H – 3-D Site Perspectives**

Figure 7.2.3.9 Neighbourhood Development Plan No. 1 (NDP 1)

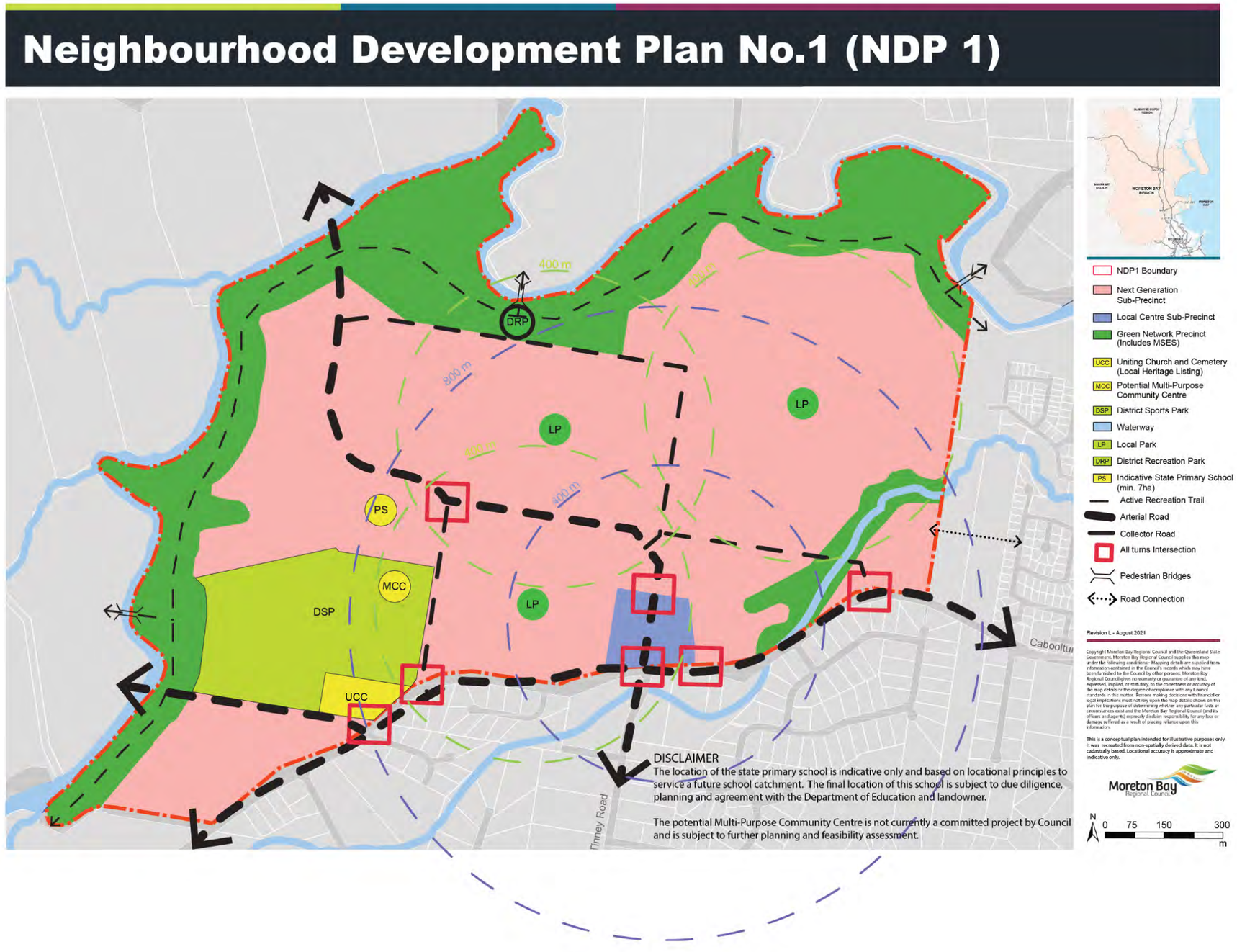



**Figure 5 – Proposed Alignment of New E-W Arterial Road**


**Figure 6A Location of Noise Logger "M1" (Road Traffic Noise)**


**Figure 6B – Site Location (Lot 2000), Residences and Location of Noise Logger "M2" (Ambient Noise)**


**Figure 6C – Monitoring Location M2 and Measurement Location 1**


**Figure 6D – Measurement Locations 1 and 2**

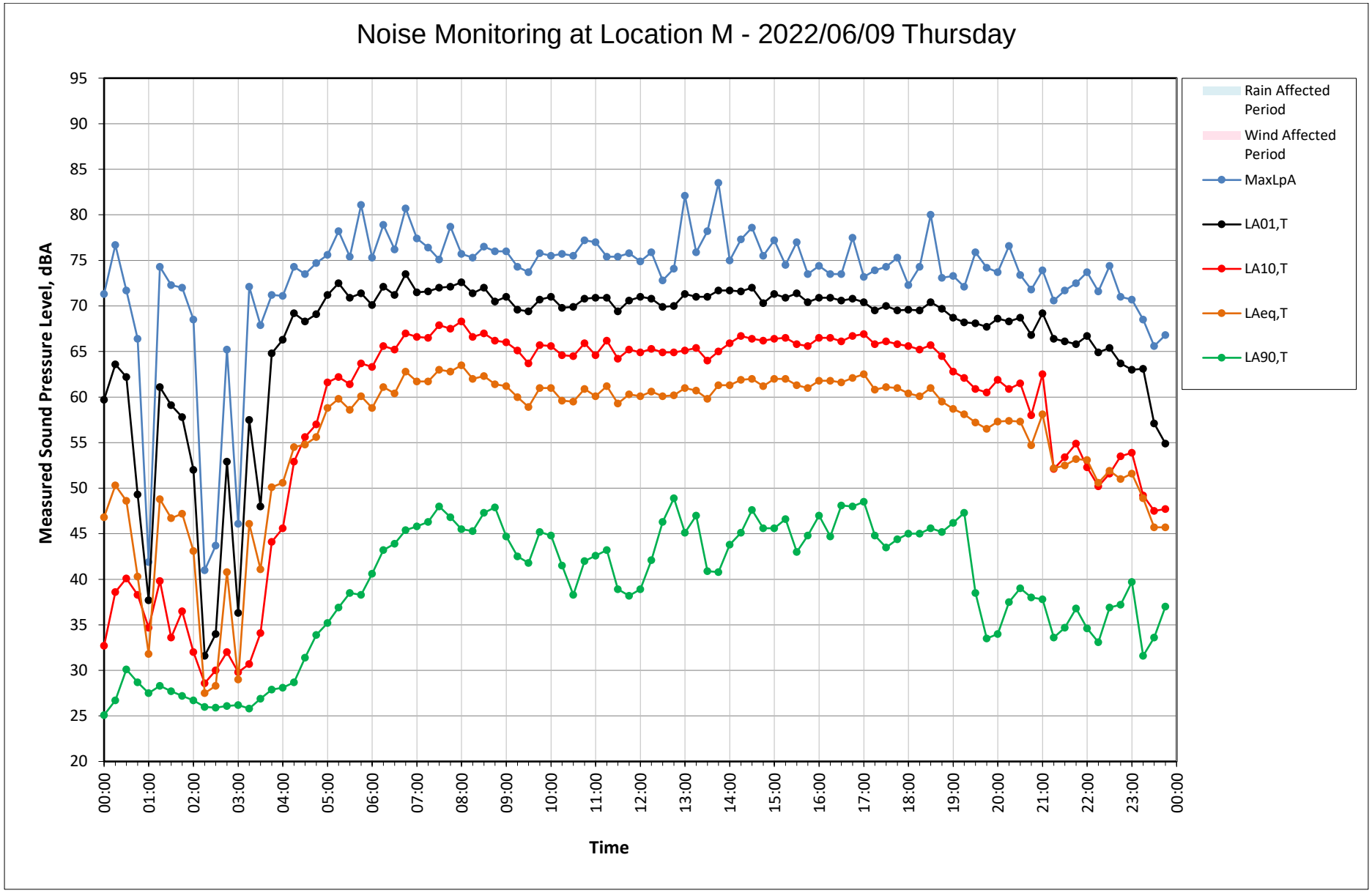



**Figure 7A – Results of Noise Level Monitoring at "M1" – Thursday 9 June 2022**


**Figure 7B – Results of Noise Level Monitoring at "M2" – Wednesday 20 November 2021**

# Figures 8-24 (Noise Contour Plots)

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 8

Free Field $L_{A10(18hour)}$ Noise Levels

Caboolture River Road (2032)
No Acoustic Barriers to Subject Site

Private Open Spaces (Application Area 1)

N

Stage 01b

Stage 01a

100m Offset from Caboolture River Road

Caboolture River Road

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 15

Free Field $L_{A10(18hour)}$ Noise Level (dBA)

| | |
|---|---|
| | <= 42 |
| 42 < | <= 44 |
| 44 < | <= 46 |
| 46 < | <= 48 |
| 48 < | <= 50 |
| 50 < | <= 52 |
| 52 < | <= 54 |
| 54 < | <= 56 |
| 56 < | <= 58 |
| 58 < | <= 60 |
| 60 < | <= 62 |
| 62 < | <= 64 |
| 64 < | <= 66 |
| 66 < | <= 68 |
| 68 < | <= 70 |
| 70 < | |

A3 Scale 1:1000

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 9

Free Field 60dBA $L_{A10(18hour)}$ Noise Level

Caboolture River Road (2032)
Acoustic Barrier Arrangement as Shown in Figure 12

Private Open Spaces (Application Area 1)

N

Stage 01b

Stage 01a

100m Offset from Caboolture River Road

Caboolture River Road

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 15

A3 Scale 1:1000

0 5 10 20 30 40 50 60 70 80 90 100 m

Free Field $L_{A10(18hour)}$ Noise Level (dBA)

<= 60 Compliant

60 < Non-compliant

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 10

Facade-Corrected $L_{A10(18hour)}$ Noise Levels
and AS3671-1989 Construction Categories

Caboolture River Road (2032)
Acoustic Barrier Arrangment as Shown in Figure 12

Ground Floor Level Receptors (Application Area 1)

N

Stage 01b

Stage 01a

100m Offset from Caboolture River Road

Caboolture River Road

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 15

A3 Scale 1:1000

0 5 10 20 30 40 50 60 70 80 90 100 m

Facade-Corrected $L_{A10(18hour)}$ Noise Level (dBA)
and AS3671-1989 Construction Categories

| | | |
|---|---|---|
| | < 48 | Construction Category 1 |
| 48 <= | < 63 | Construction Category 2 |
| 63 <= | < 73 | Construction Category 3 |
| 73 <= | | Construction Category 4 |

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 11

Facade-Corrected $L_{A10(18hour)}$ Noise Levels
and AS3671-1989 Construction Categories

Caboolture River Road (2032)
Acoustic Barrier Arrangment as Shown in Figure 12

First Floor Level Receptors (Application Area 1)

N

Stage 01b

Stage 01a

100m Offset from Caboolture River Road

Caboolture River Road

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 15

A3 Scale 1:1000

0 5 10 20 30 40 50 60 70 80 90 100 m

Facade-Corrected $L_{A10(18hour)}$ Noise Level (dBA)
and AS3671-1989 Construction Categories

| | | |
|---|---|---|
| | < 48 | Construction Category 1 |
| 48 <= | < 63 | Construction Category 2 |
| 63 <= | < 73 | Construction Category 3 |
| 73 <= | | Construction Category 4 |

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 12

Alignment of Acoustic Barriers
Approved 1.8m High Acoustic Barriers Shown Brown
New 1.8m High Acoustic Barriers Shown Bold Magenta

N

# Stage 01a

ROAD 03

ROAD 05

ROAD 06

ROAD 03

53 52 51 34 35 36 37 38 39 40

50 49 48 47 46 45 44 43 42 41

A3 Scale 1:400

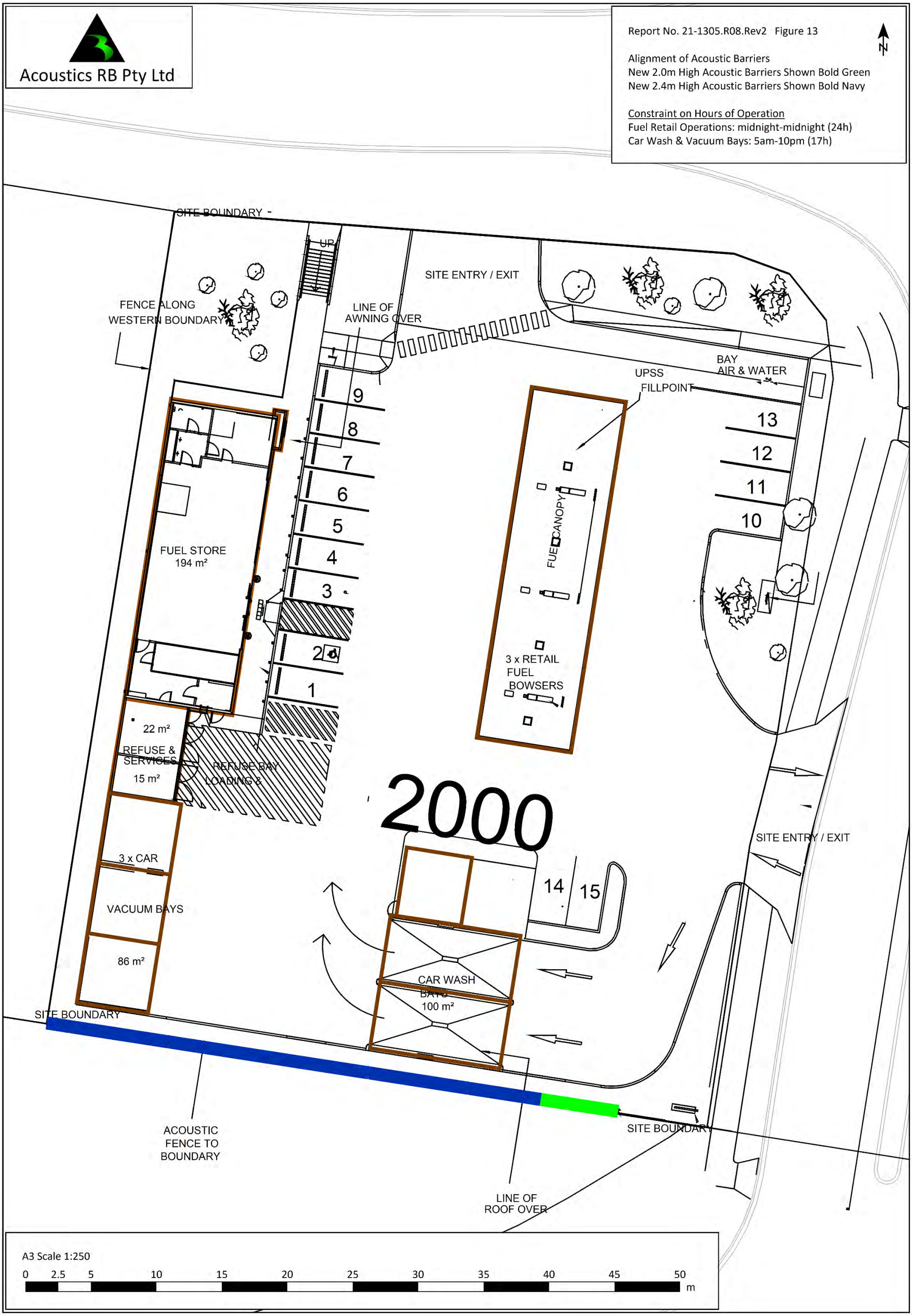
0 2.5 5 10 15 20 25 30 35 40 45 50 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 13

Alignment of Acoustic Barriers
New 2.0m High Acoustic Barriers Shown Bold Green
New 2.4m High Acoustic Barriers Shown Bold Navy

Constraint on Hours of Operation
Fuel Retail Operations: midnight-midnight (24h)
Car Wash & Vacuum Bays: 5am-10pm (17h)



Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 14

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail Operations (Day Time Period: Peak)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 12 ROAD 15

1004 1005 2000

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 15

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail Operations (Day Time Period: Off-peak)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 16

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail Operations (Evening Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

1004

1005

2000

Caboolture River Road

Ada Crescent

ROAD 01
ROAD 02
ROAD 03
ROAD 04
ROAD 05
ROAD 06
ROAD 10
ROAD 11
ROAD 12
ROAD 15

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 27
= 28
= 29
= 30
= 31
= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 17

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail Operations (Night Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 12 ROAD 15

1005 2000 1004

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 20
= 21
= 22
= 23
= 24
= 25
= 26
= 27
= 28
= 29
= 30
= 31
= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 17A

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail Operations (Night Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

Darley Road

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 12 ROAD 15

1004 1005 2000

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 34
= 38
= 40

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 18

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Car Wash Operations (Day Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 19

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Car Wash Operations (Evening Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 10 ROAD 11 ROAD 12 ROAD 15

1004 1005 2000

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 27
= 28
= 29
= 30
= 31
= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 20

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Car Wash Operations (Late Night Time Period: 05:00-07:00)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 21

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail and Car Wash Operations (Day Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 10 ROAD 11 ROAD 12 ROAD 15

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 21A

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail and Car Wash Operations (Day Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

1004

1005

2000

ROAD 01
ROAD 02
ROAD 03
ROAD 04
ROAD 05
ROAD 06
ROAD 10
ROAD 11
ROAD 12
ROAD 15

Caboolture River Road

Ada Crescent

Darley Road

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 46
= 50
= 52

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 22

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail and Car Wash Operations (Evening Time Period)

Acoustic Barrier Arrangments Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 12 ROAD 15

1000 1001 1002 1003 1004 1005 2000

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 27
= 28
= 29
= 30
= 31
= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 22A

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail and Car Wash Operations (Evening Time Period)

Acoustic Barrier Arrangements Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

2000

1004

1005

Caboolture River Road

Ada Crescent

Darley Road

ROAD 01
ROAD 02
ROAD 03
ROAD 04
ROAD 05
ROAD 06
ROAD 10
ROAD 11
ROAD 12
ROAD 15

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 40
= 45
= 47

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 23

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel, Retail, General Deliveries and Car Wash Operations
(Late Night Time Period: 05:00-07:00)

Acoustic Barrier Arrangements Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 12 ROAD 15

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 32
= 33
= 34
= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 23A

Free Field $L_{Aeq,adj,15min}$ Noise Levels

Proposed Service Centre
Fuel Retail and Car Wash Operations
(Late Night Time Period: 05:00-07:00)

Acoustic Barrier Arrangements Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

Caboolture River Road

Ada Crescent

Darley Road

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 10 ROAD 11 ROAD 12 ROAD 15

1004 1005 2000

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

Free Field $L_{Aeq,adj,15min}$ Noise Level (dBA)

= 46
= 50
= 52

Acoustics RB Pty Ltd

Report No. 21-1305.R08.Rev2 Figure 24

Free Field Average $L_{Amax}$ Noise Levels

Proposed Service Centre
Car Door Closures Due Patron Activities, General Deliveries and Tyre Inflation Alarm at Air & Water Bay

Acoustic Barrier Arrangements Shown in Figures 12 and 13

Receiver Height = 1.6m agl

N

Stage 01b

Stage 01a

1004

1005

2000

Caboolture River Road

Ada Crescent

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 10 ROAD 11 ROAD 12 ROAD 15

Free Field Average
$L_{Amax}$ Noise Level (dBA)

= 35
= 36
= 37
= 38
= 39
= 40
= 41
= 42
= 43
= 44
= 45
= 46
= 47
= 48
= 49
= 50
= 51
= 52
= 53
= 54
= 55
= 56
= 57
= 58
= 59
= 60
= 61
= 62
= 63
= 64

A3 Scale 1:1500

0 5 10 20 30 40 50 60 70 80 90 100 m

# Attachment A

## Constraint on Adoption of QDC MP 4.4

Section 8 *Assessment of Road Traffic and Railway Noise* of SC 6.17 *Planning Scheme Policy – Noise* outlines the process of establishing acceptable acoustical amenity at sites impacted by noise from roads and railways. At Section 8.1 *Reconfiguring a Lot* of SC 6.16, it is stated:-

> "The [transport noise impact] assessment is to be in accordance with MP4 .4 of the QDC. The assessment is to identify the noise category applicable to each lot in the proposed development for both lower and upper levels. Noise categories are defined in Schedule 3 of MP4.4."

With respect to s.8.1, it is relevant to have regard to *Queensland Development Code MP4.4 Buildings in a Transport Noise Corridor* (QDC MP4.4) and Chapter 8B (especially s.246X) of *Building Act 1975.*

The relevant extracts from QDC MP4.4 follow below.

### 1 Purpose

To ensure *habitable rooms* of particular residential buildings located in *transport noise corridors* are designed and constructed to reduce the extent to which *transport noise* intrudes into those rooms.

### 3 Application

This QDC part applies to building work for a *relevant residential building* if the work is the subject of a building development application made on or after 17 August 2015.

### 6 What is a *relevant residential building*

A building is a *relevant residential building* if:

(a) a building development application for the construction of the building is made after 31 August 2010; and

(b) the building:

  (i) is a class 1, 2, 3 or 4 building; and

  (ii) is located in a *transport noise corridor*; and

  (iii) is not a *relocated building*; and

(c) the building development approval for the construction of the building was not given under the building assessment provisions in force immediately before 1 September 2010, under section 37 of the *Building Act 1975*.

At Section 8 *Definitions* of QDC MP4.4, "transport noise corridor is defined as follows:-

***Transport noise corridor*** means land designated under Chapter 8B of the *Building Act 1975 as a transport noise corridor.*

*Note: This is identified in State and Local Government records as described in a gazettal notice following designation of the transport noise corridor.*

As noted above, the purpose of QDC MP4.4 is to ensure control of transport noise intrusion into particular residential buildings, specifically "relevant residential buildings", where as noted in the definition above, a relevant residential building must be located within a Transport Noise Corridor (TNC) as defined at Chapter 8B of *Building Act 1975* and, more particularly, at s.246X and s.246Y of the Act.

The subject site is not located in a TNC. Therefore, the provisions of QDC MP4.4 are not triggered.

Whether it is possible to extend the application of QDC MP 4.4 beyond its purpose is a town planning/legal question.

In the absence of an answer to that question and to avoid any inadvertent conflict by attempting to invoke QDC MP 4.4 where it cannot be properly applied, the appropriate means of controlling of road traffic noise intrusion is to apply the more robust methodology of the calculation methods of AS3671-1989 *Acoustics – Road traffic noise intrusion - Building siting and construction* to the design of noise affected residences, with the goal being to achieve compliance with the recommended internal sound levels of AS/NZS 2107:2016 A*coustics – Recommended design sound levels and reverberation times for building interiors*.

# Attachment B

## Derivation of Upper and Lower Bounds of Construction Categories

The upper and lower bounds of the Construction Categories can be derived in the following manner.

Internal noise level limits set by AS/NZS 2107:2016:-

* Bedrooms and sleeping areas: 35dBA ($L_{Aeq,1hr\ night}$)
* Living and work areas: 40dBA ($L_{Aeq,1hr\ day}$)

Reduction external to internal, glazing open (includes conversion from free field to facade-corrected): 10dBA

External noise limits (facade-corrected):-

* Night: 45dBA ($L_{Aeq,1hr\ night}$)
* Day: 50dBA ($L_{Aeq,1\ hr\ day}$)

Offsets: +3.3dBA (night)
-0.6dBA (day)

Resultant Facade-Corrected External $L_{A10(18hour)}$ Limit:

* Based on internal limits during night: 48.3dBA (48dBA rounded)
* Based on internal limits during day: 49.4dBA (49dBA rounded)

On the basis of these results, the noise level external to the most exposed facade of any residence should not exceed a facade-corrected noise level of **48dBA** $L_{A10(18hour)}$ if the internal noise level limits of AS/NZS 2107:2000 are to be met when windows and external doors are **open**. This is the upper bound Construction Category 1 and the lower bound of Construction Category 2.

Internal noise level limits set by AS/NZS 2107:2016:-

* Bedrooms and sleeping areas: 35dBA ($L_{Aeq,1hr\ night}$)
* Living and work areas: 40dBA ($L_{Aeq,1hr\ day}$)

Reduction external to internal, glazing open (includes conversion from free field to facade-corrected): 25dBA

External noise limits (facade-corrected):-

* Night: 60dBA ($L_{Aeq,1hr\ night}$)
* Day: 65dBA ($L_{Aeq,1\ hr\ day}$)

Offsets: +3.3dBA (night)
-0.6dBA (day)

Resultant Facade-Corrected External $L_{A10(18hour)}$ Limit:

* Based on internal limits during night: 63.3dBA (63dBA rounded)
* Based on internal limits during day: 64.4dBA (64dBA rounded)

On the basis of these results, the noise level external to the most exposed facade of any residence should not exceed a facade-corrected noise level of **63dBA** $L_{A10(18hour)}$ if the internal noise level limits of AS/NZS 2107:2016 are to be met when standard construction windows and external doors are **closed**. This is the upper bound Construction Category 2 and the lower bound of Construction Category 3.