



PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2023/1441

Date: 29 February 2024



Queensland
Government

TRAFFIC NOISE IMPACT ASSESSMENT

PROPOSED PRECINCT 4 ROL7 DEVELOPMENT

YARRABILBA

Prepared for:
Lendlease

Prepared by:
MWA Environmental

16 February 2024

DOCUMENT CONTROL SHEET

MWA Environmental	
Level 7 241 Adelaide Street GPO Box 3137 Brisbane 4001	Job Name: Yarrabilba Job No: 23114
Telephone: 07 3002 5500	Original Date of Issue: 16 February 2024
Email: mail@mwaenviro.com.au	

DOCUMENT DETAILS

Title:	Traffic Noise Impact Assessment – Proposed Precinct 4 ROL7 Development, Yarrabilba
Principal Author:	Mr Elton Singh
Client:	Lendlease
Client Address:	GPO Box 2777, Brisbane QLD 4001
Client Contact:	Mr John Kibble

REVISION/CHECKING HISTORY

Version Number	Date	Issued By		Checked By	
1 DA Report	21.09.23	ES		PAK	
2 DA Report	16.02.24	ES		PAK	
3					
4					
5					
6					

DISTRIBUTION RECORD

[illegible]

CONTENTS	PAGE
1.0 INTRODUCTION.....	2
1.1 STUDY BRIEF	2
1.2 SITE DESCRIPTION	2
1.3 PROPOSED DEVELOPMENT	2
2.0 RELEVANT NOISE CRITERIA.....	3
2.1 EXTERNAL NOISE CRITERIA	3
2.2 QDC MP4.4 NOISE CATEGORIES	4
3.0 TRAFFIC NOISE IMPACT ASSESSMENT	5
3.1 TRAFFIC NOISE ASSESSMENT	5
3.1.1 Traffic Volume Data	5
3.1.2 Predicted Future Traffic Noise Levels – Residential Outdoor Areas	6
3.1.3 Predicted Future Traffic Noise Levels – QDC MP4.4 Noise Categories ..	6
4.0 CONCLUSIONS.....	9

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 STUDY BRIEF

MWA Environmental has been engaged to prepare a Traffic Noise Impact Assessment for the proposed 'Precinct 4 ROL7' development at Yarrabilba.

The report has assessed the potential road traffic noise impact and mitigation measures associated with the local Sub Arterial corridor within the Yarrabilba development area based on the lot reconfiguration plan and civil earthworks design.

Using standard traffic noise assessment methodology and ultimate planning horizon traffic forecasts, this assessment has been conducted using computer noise modelling of the road traffic volumes on the Sub Arterial Roads as part of Yarrabilba development, and considering the following:

- Preliminary design level contours for Precinct 4 ROL7 by KN Group;
- Proposed reconfiguration of lot for Precinct 4 ROL7 by KN Group;
- Preliminary civil works levels for the ultimate Sub Arterial Road corridors provided by KN Group; and
- Updated ultimate planning horizon traffic design data for the road corridor as advised by SLR.

1.2 SITE DESCRIPTION

The proposed Precinct 4 ROL7 development is located in the central part of the overall Yarrabilba development. The site location is shown on **Figure 1**.

The Sub Arterial Road, Wentland Avenue and McKenny Boulevard is located along the northern side of Precinct 4 ROL7.

1.3 PROPOSED DEVELOPMENT

The proposed overall Precinct 4 ROL7 development comprises approximately 118 residential allotments and associated internal road network.

The development plan is shown on **Attachment 1**.

2.0 RELEVANT NOISE CRITERIA

2.1 EXTERNAL NOISE CRITERIA

The Logan Planning Scheme 2015 requirements for the assessment and mitigation of road traffic noise from Council-controlled roadways are limited to regulation of the acoustic treatment of houses within designated 'transport noise corridors' through the Queensland Development Code. There are no external traffic noise criteria in the current Logan Planning Scheme 2015 and there does not appear to be a specific requirement for assessment of road traffic noise for a reconfiguration of lot adjacent to a road that is not a designated 'transport noise corridor'.

Logan City Council has gazetted transport noise corridors under the Building Act 1975 which provides for the regulation of the acoustic treatment of dwellings affected by road traffic noise in accordance with Queensland Development Code Mandatory Part 4.4 ' *Buildings in a transport noise corridor* ' (**MP4.4**). This process is managed by private certifiers based upon overlay mapping managed by the Queensland Department of Housing and Public Works.

The Arterial and Major Collector road corridors are not currently gazetted as a transport noise corridor but is likely to be at some stage in the future if and when traffic volumes exceed 5,000 vehicles per day. Until such time as the road corridors is gazetted as a 'transport noise corridor' there is unlikely to be a requirement for acoustic treatment of houses in proximity to the road. There is the potential that houses may already be constructed on allotments adjacent to the road prior to a 'transport noise corridor' being gazetted and thus no acoustic treatment requirements would be applied.

This notwithstanding, this assessment has addressed the methodology and criteria of the TMR *Road Traffic Noise Management: Code of Practice*, Queensland Development Code (QDC) *MP4.4 – Buildings in a Transport Noise Corridor* and *State Code 1: Development in a state-controlled road environment (SDAP)*.

The assessment has considered what noise levels would be experienced at the backyard of the proposed allotments to comply with a 60 dB(A) L₁₀ 18 hour (free-field) noise limit typically applied by the more recent SDAP and the MP4.4 'noise categories' (which define standard of acoustic treatment required) that would be expected within a transport noise corridor if gazetted after completion.

The relevant criteria for the assessment of noise impacts are outlined in *State Code 1*, as follows:

Involving the creation of 6 or more new residential lots adjacent to a state-controlled road or type 1 multi-modal corridor	
PO38 Reconfiguring a lot minimises free field noise intrusion from a state-controlled road .	AO38.1 Development provides noise barrier or earth mound which is designed, sited and constructed: - to achieve the maximum free field acoustic levels in reference table 2 (item 2.1); - in accordance with: - Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; - Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; - Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR AO38.2 Development achieves the maximum free field acoustic levels in reference table 2 (item 2.1) by alternative noise attenuation measures where it is not practical to provide a noise barrier or earth mound.

Table 2: Maximum free field acoustic levels

Applicable use	Acoustic levels
2.1: Private open space for residential lots	a. ≤ 57 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight ≤ 45 dB(A))
2.2: Private open space for an accommodation activity (including lots created for a future accommodation activity)	OR b. ≤ 60 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight > 45 dB(A))
2.3: Outdoor education areas and outdoor play areas in a childcare centre or educational establishment	≤ 63 dB(A) L_{10} (12 hour) free field (between 6am and 6pm)

2.2 QDC MP4.4 NOISE CATEGORIES

Since implementation in August 2010, assessment of internal road traffic noise amenity (i.e. within habitable rooms) for dwellings adjacent to state-controlled roads is regulated by the Queensland Development Code (QDC) MP4.4 *Buildings in a Transport Noise Corridor* (“**QDC MP4.4**”).

An objective of this noise assessment is to determine which QDC MP4.4 noise categories are appropriate for proposed allotments. Under MP4.4 the specific acoustic treatment requirements for proposed dwellings are dependent upon the noise exposure category of the building site, as follows:

Table 1: Summary of QDC MP4.4 Traffic Noise Categories

QDC MP4.4 Noise Category	L_{10} 18 hour* for state-controlled roads
Category 4	≥ 73 dB(A)
Category 3	68 – 72 dB(A)
Category 2	63 – 67 dB(A)
Category 1	58 - 62 dB(A)
Category 0 (no acoustic treatment required)	≤ 57 dB(A)

* measured at 1 m from the façade of the proposed or existing building.

3.0 TRAFFIC NOISE IMPACT ASSESSMENT

3.1 TRAFFIC NOISE ASSESSMENT

In order to assess compliance with the SDAP noise criteria, ultimate design horizon traffic noise predictions have been predicted across the site. The ultimate design horizon is applied considering Yarrabilba masterplan is near 100 percentage developed, this implies that:

- Wentland Drive extended east to connect with Plunkett Road.
- Town Centre North South Road extended south to connect with Plunkett Road.
- Southern Infrastructure Corridor (SIC) (along northern boundary of Yarrabilba) is in place.

The noise model has represented the design horizon of the development traffic on the Sub Arterial roads adjacent to the proposed precinct based upon the design topographical contours of the road and of Precinct 4 ROL7 allotments.

The SoundPLAN 8.2 model was setup to predict the external L₁₀ (18 hour) traffic noise levels under ultimate design traffic flow conditions.

Adjustment of CoRTN predictions has been made for Australian roads as per the Department of Transport and Main Roads - Code of Practice guidance. Corrections of -0.7 dB for free-field predictions and -1.7 dB for façade adjusted predictions have been applied.

3.1.1 Traffic Volume Data

The design horizon traffic volumes (daily two way total) and speed limits provided by SLR are as provided in the **Table 2** below.

The 18 hour (6am to Midnight) traffic volume has been approximated as 94% of the daily volume. Heavy vehicle percentage is considered to be a conservative 3% for modelling purposes as advised by SLR.

Table 2: Design Traffic Volume Data

Planning Horizon	Road Section	Daily Vehicles Volume (AADT)	Speed (km/hr)
Ultimate Design	Wentland Avenue – west of McKenny Boulevard	10,415	60
	Wentland Avenue -east of McKenny Boulevard	13,520	
	McKenny Boulevard	10,585	

3.1.2 Predicted Future Traffic Noise Levels – Residential Outdoor Areas

A SoundPLAN 8.2 model was setup to predict the external L_{10} (18 hour) traffic noise levels under ultimate design traffic flow conditions for Ground Level (+1.8m) and Upper Level (+4.6m) receptors **with acoustic barriers**. The recommended acoustic barriers were represented at height of **2.2 metres above the proposed allotment pad level or on top of the retaining wall**, whichever is the higher point as shown on **Figure 2**.

The results of the traffic noise modelling for ground level receptors within Precinct 4 ROL7 indicates that the adopted SDAP noise criterion of 60 dB(A) L_{10} (18 hour) for outdoor recreation space (backyards) will comply at all allotments along the road frontage.

The predicted road traffic noise contour maps which demonstrate areas in compliance of the 60 dB(A) L_{10} (18 hour) for outdoor spaces are provided in **Attachment 2**.

3.1.3 Predicted Future Traffic Noise Levels – QDC MP4.4 Noise Categories

Under the *Building Act 1975*, the transport Chief Executive may designate land as being within a transport noise corridor and compliance with QDC MP4.4 is required if the land is within:

- 100 metres of a state-controlled road; or
- Up to 250 metres of a state-controlled road if the noise of traffic on the road is at least 58 dB(A).

Effectively, for the purposes of land use planning assessment and the design of future dwellings in accordance with the QDC, acoustic treatment may be required for dwellings located within 250 metres of the roadway if external L_{10} (18 hour) noise levels exceed 58 dB(A). This notwithstanding, it is noted that this may occur some stage in the future under an ultimate design horizon or when the Southern Infrastructure Corridor is commissioned, however it is expected that up to and after Year 2034 the land within 100 metres of the Sub Arterial Roads would at some time be designated as being within a transport noise corridor.

In the event that major roads were to be gazetted as a 100 metre transport noise corridor then, based upon our modelling for Precinct 4 ROL7, single-storey dwellings adjoining the road corridor boundaries would be subject to QDC MP4.4 'Noise Category 0 to 2' acoustic treatment requirements.

For the upper level of any two-storey houses within Precinct 4 ROL7 a maximum 'Noise Category 0 and 3' acoustic treatment requirement would apply.

Table 3 below presents the affected allotments within a 100 metre transport corridor and the applicable QDC MP4.4 noise categories for any future single or two storey dwellings on the allotments within Precinct 4 ROL7.

A copy of the Queensland Development Code (QDC) *MP4.4 – Buildings in a Transport Noise Corridor* is included in **Attachment 3** including indicative acceptable forms of construction.

Table 3: Recommended QDC MP4.4 ‘Noise Categories’ for ‘Precinct 4 ROL7’ Allotments

QDC MP4.4 Noise Categories PRECINCT 4 ROL7		
Lot #	Single storey house / ground floor	Upper floor of two storey house
73	Category 0	Category 0
74	Category 0	Category 1
75	Category 0	Category 1
76	Category 1	Category 3
77	Category 1	Category 3
78	Category 1	Category 3
79	Category 0	Category 1
80	Category 0	Category 0
81	Category 0	Category 0
88	Category 0	Category 0
89	Category 0	Category 0
90	Category 0	Category 0
91	Category 0	Category 1
92	Category 1	Category 1
93	Category 2	Category 3
105	Category 0	Category 0
106	Category 0	Category 0
107	Category 0	Category 0
108	Category 0	Category 1
109	Category 1	Category 1
110	Category 2	Category 3
111	Category 1	Category 3
112	Category 1	Category 3
113	Category 1	Category 3
114	Category 1	Category 3
115	Category 1	Category 3
116	Category 0	Category 0
117	Category 0	Category 0
118	Category 0	Category 0
129	Category 0	Category 0
130	Category 0	Category 0
131	Category 0	Category 0
132	Category 0	Category 1

The SoundPLAN model predictions are presented as plots of predicted Year 2034 L_{10} (18 hour) traffic noise levels (including +2.5dB façade reflection) over the proposed residential subdivision for ground level (+1.8m) receptors (refer **Attachment 4**).

The SoundPLAN model predictions are also presented as plots of predicted Year 2034 L_{10} (18 hour) traffic noise levels (including +2.5dB façade reflection) over the proposed residential subdivision for upper level (+4.6m) receptors (refer **Attachment 5**).

4.0 CONCLUSIONS

MWA Environmental has been engaged by Lend Lease to prepare a Traffic Noise Impact Assessment for the proposed 'Precinct 4 ROL7' development at Yarrabilba.

The report has assessed the potential road traffic noise impact and mitigation measures associated with the adjacent Sub Arterial Road corridor within the Yarrabilba development area based on Precinct 4 ROL7 lot reconfiguration plan and civil earthworks design.

The road corridor is not currently gazetted as a transport noise corridor but it is likely to be at some stage in the future if and when traffic volumes exceed 5,000 vehicles per day. Until such time as the road corridor is gazetted as a 'transport noise corridor' there is unlikely to be a requirement for acoustic treatment of houses in proximity to the road. There is the potential that houses may be constructed on allotments adjacent to the road prior to a 'transport noise corridor' being gazetted and thus no acoustic treatment requirements would be applied at the time of construction.

This notwithstanding, this assessment has addressed the methodology and criteria of the TMR *Road Traffic Noise Management: Code of Practice, State Code 1: Development in a state-controlled road environment (SDAP)* and Queensland Development Code (QDC) *MP4.4 – Buildings in a Transport Noise Corridor*.

The assessment has considered what noise levels would be experienced at the backyard of the proposed allotments to comply with a 60 dB(A) L₁₀ 18 hour noise limit typically applied and the MP4.4 'noise categories' (which define standard of acoustic treatment required) would be expected within a transport noise corridor if gazetted after completion.

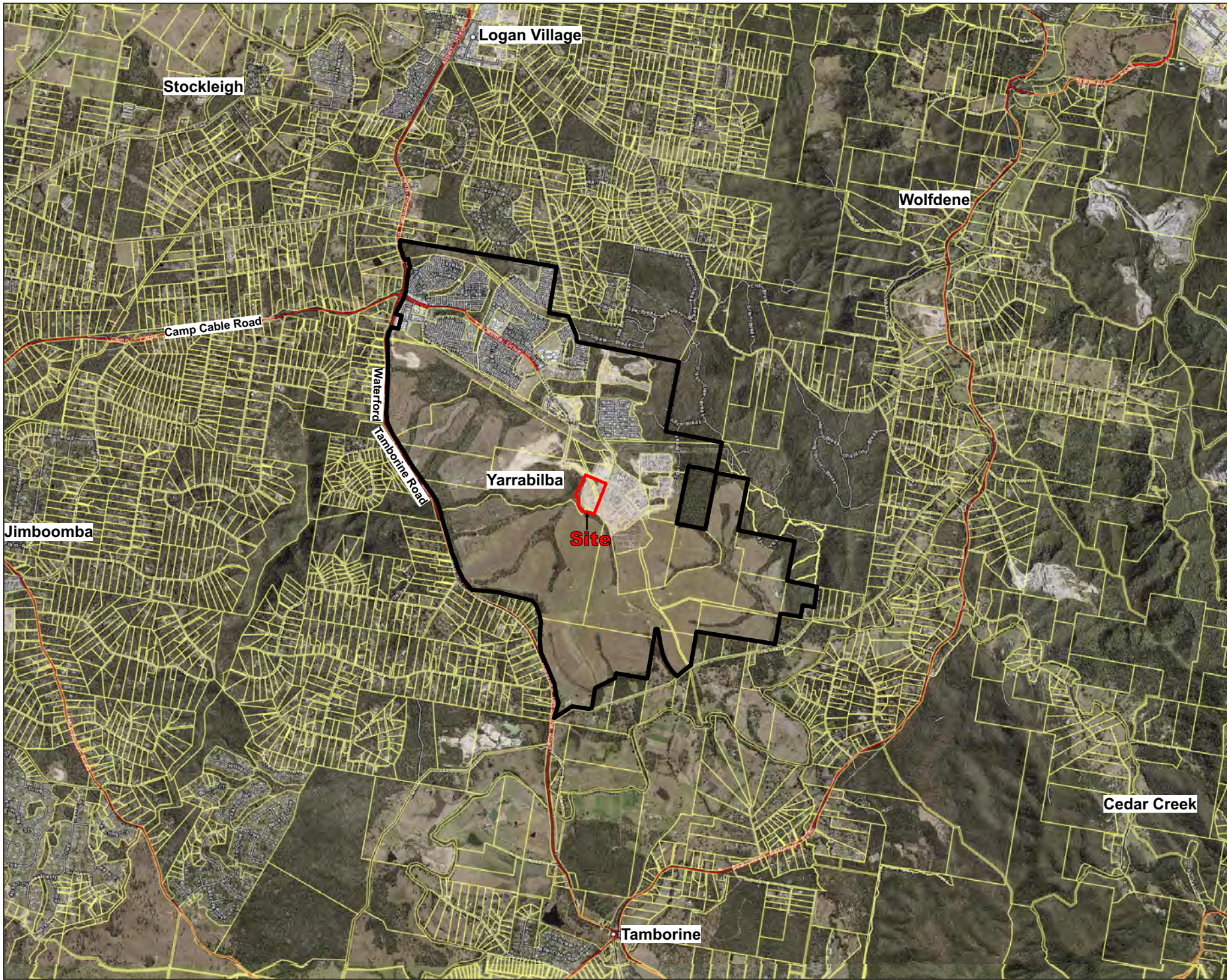
The results of the traffic noise modelling for outdoor areas within Precinct 4 ROL7 indicates that the adopted noise criterion of 60 dB(A) L₁₀ (18 hour) for outdoor recreation space (backyards) will achieve compliance at all of the proposed allotment within Precinct 4 ROL7 with the inclusion of acoustic barriers at height of **2.2 metres above the allotment pad level or on top of the retaining wall**, whichever is the higher point as shown on **Figure 2**.

In the event that major roads were to be gazetted as a 100 metre transport noise corridor then, based upon our modelling for Precinct 4 ROL7, single-storey dwellings adjoining the road corridor boundaries would be subject to QDC MP4.4 'Noise Category 0 to 2' acoustic treatment requirements. For the upper level of any two-storey houses within Precinct 4 ROL7 a maximum 'Noise Category 0 to 3' acoustic treatment requirement would apply.

Table 3 of this report presents the affected allotments and the applicable QDC MP4.4 noise categories for any future single or double storey dwellings on the allotment within Precinct 4 ROL7.

MWA Environmental
16 February 2024

FIGURES



LEGEND

— PROPERTY BOUNDARY
— SITE LOCATION (PRECINCT 4 ROL7)

DRAWING REFERENCE
© THE STATE OF QUEENSLAND
(DEPARTMENT OF RESOURCES)
QLDGLOBE.

0 1.0 2.0km

CLIENT
LENDELEASE

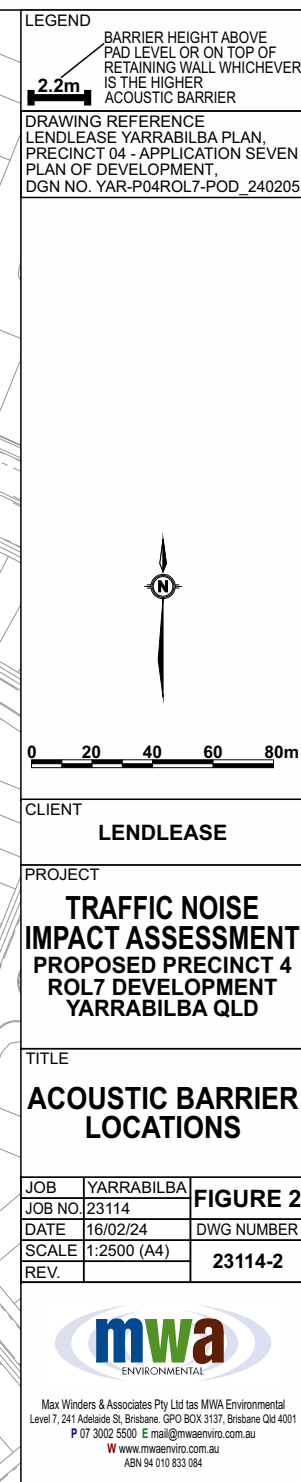
PROJECT
**TRAFFIC NOISE
IMPACT ASSESSMENT
PROPOSED PRECINCT 4
ROL7 DEVELOPMENT
YARRABILBA QLD**

TITLE
SITE LOCATION

JOB	YARRABILBA	FIGURE 1
JOB NO.	23114	
DATE	16/02/24	
SCALE	1:70000 (A4)	
REV.		23114-1



Max Winders & Associates Pty Ltd t/as MWA Environmental
Level 7, 241 Adelaide St, Brisbane, QLD 4001
P 07 3002 5500 E mail@mwaenviro.com.au
W www.mwaenviro.com.au
ABN 94 010 833 084



Attachment 1

Development Plans

- LEGEND
- OPTIONAL BUILD TO BOUNDARY
 - NO VEHICULAR ACCESS
 - PROPOSED STAGE BOUNDARY
 - PRECINCT 4 - APPLICATION SEVEN BOUNDARY
 - POTENTIAL ENTRY STATEMENT LOCATION
 - BIN PADS FOR SHARED COMMON DRIVEWAYS
 - MIN. BUILDING SETBACK TO UNMANAGED VEGETATION
 - ACOUSTIC ATTENUATION MAY BE REQUIRED (in accordance with Traffic Noise Assessment report prepared by MVA Environmental)
 - NO BUILDING ADJOINING ELECTRICAL TRANSFORMER

*** Dwelling to address the primary frontage by incorporating the following:
- Entry, porch/verandah
- Principal front door and windows
- Letterbox
- Pedestrian Access
- Max. fence height of 1.2m

SETBACK TABLE

LOT TYPE		GROUND FLOOR			FIRST FLOOR			CORNER LOTS - SECONDARY FRONTAGE
		FRONT - PRIMARY FRONTAGE	REAR AND SIDE (to wall)	BUILD TO BOUNDARY	FRONT	SIDE	REAR	
(T2, T5)	TRADITIONAL	3.0	0.9	N/A	3.0	2.0	0.9	1.5
(C2, C3, C4, C5)	COURTYARD	3.0	0.9	0.0	3.0	1.0	0.9	1.5
(PV, PV2)	PREMIUM VILLA	3.0	0.9	0.0	3.0	1.0	0.9	1.5
(V)	VILLA	3.0	0.9	0.0	3.0	1.0	0.9	1.5

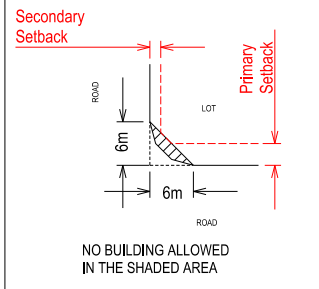
NOTE:
ALL GARAGES MUST BE SETBACK 5.0m TO THE FRONT WALL AND A FURTHER 240mm TO THE GARAGE DOOR. SETBACKS ARE AS PER TABLE UNLESS OTHERWISE DIMENSIONED. ALL SETBACKS ARE TO WALL (EXCLUDES TCD ALLOTMENTS).
WHERE THE LOWER FACE OF A REAR BOUNDARY RETAINING WALL EXCEEDS 2M IN HEIGHT THE MINIMUM SETBACK IS 2.5M TO THE GROUND AND SECOND FLOOR OF THE DWELLING.
* INCLUDES GARAGES

RETAINING WALL HEIGHT TABLE

LOT TYPE	Traditional	Courtyard	Premium Vills	Vills	Maximum Retaining Height	
	EARTHWORKS					
Front Boundaries	Cut Average	1.5	1.4	1.25	1.0	1.8
Side Boundaries	Cut Average	1.0	0.7	0.6	0.5	1.8
Side Boundaries	Fill Average	1.5	0.7	0.6	0.5	1.2
Rear Boundary	Cut Average	1.5	1.5	1.5	1.5	1.8
Rear Boundary	Fill Average	1.5	1.5	1.5	1.5	1.8

NOTE: RETAINING WALLS WITH A HEIGHT OF 1.0M OR MORE REQUIRE RPEQ CERTIFICATION

SPECIAL SITING REQUIREMENTS FOR CORNER ALLOTMENTS



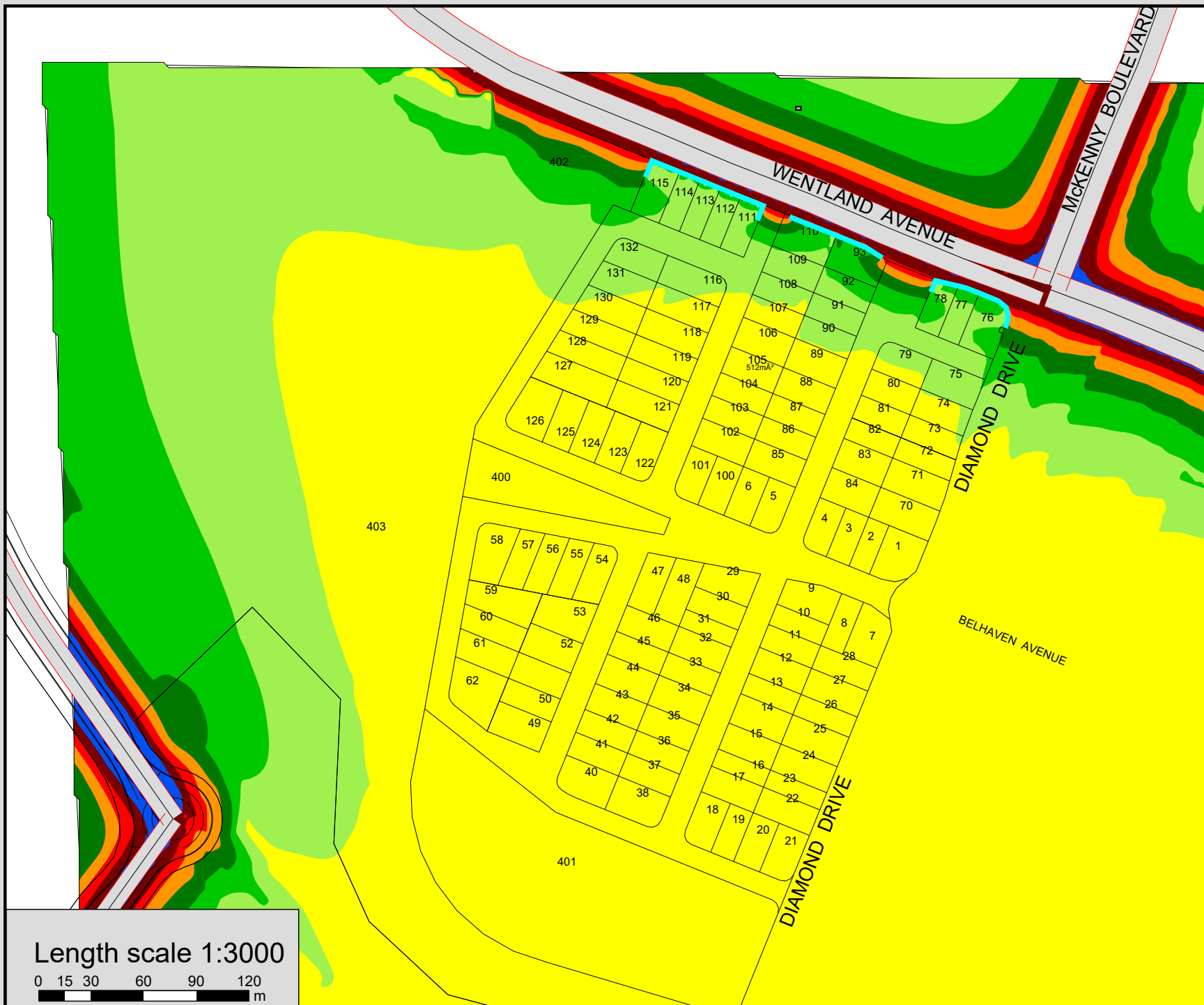
THESE CRITERIA MUST BE READ IN CONJUNCTION WITH RESIDENTIAL PLAN OF DEVELOPMENT SHEET 1 OF 2 [DGN No YAR-P04ROL7-POD240205] - DESIGN CRITERIA FOR RESIDENTIAL DEVELOPMENT

PRECINCT 04 - APPLICATION SEVEN
PLAN OF DEVELOPMENT

NOTE: This plan is indicative only, and specific uses, road alignment, boundaries, setbacks, and building layout shown may vary due to detailed design consideration. © 2023 Lendlease Communities (Australia). All rights reserved. Except as permitted by Lendlease, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the permission of Lendlease.

Attachment 2

*SoundPLAN 8.2 Modelling
Design Horizon Traffic Noise Predictions – Outdoor Recreation Space*



Noise level
L10(18hr)
in dB(A)

≤ 54	≤ 54
54 <	≤ 57
57 <	≤ 60
60 <	≤ 63
63 <	≤ 66
66 <	≤ 69
69 <	≤ 72
72 <	≤ 75

Legend

- Cadastral
- 2.2m Noise Barrier
- Road
- ▨ Lots Requiring Designated Private Open Space

**Yarrabilba 23114
Precinct 4 ROL7 (4G)**

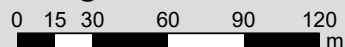
**Ultimate Traffic Noise
Model**

**Outdoor Recreational
Noise Impact With
Barriers**

February 2024



Length scale 1:3000



Attachment 3

QDC MP4.4 – Acceptable Solutions

Schedule 1

Noise category	Minimum transport noise reduction (dB (A)) required for habitable rooms	Component of building's external envelope	Minimum R_w required for each component
Category 4	40	Glazing	43
		External walls	52
		Roof	45
		Floors	51
		Entry doors	35
Category 3	35	Glazing	38 (where total area of glazing for a <i>habitable room</i> is greater than 1.8m ²)
			35 (where total area of glazing for a <i>habitable room</i> is less than or equal to 1.8m ²)
		External walls	47
		Roof	41
		Floors	45
		Entry doors	33

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

Schedule 2

Component of building's external envelope	Minimum R_w	Acceptable forms of construction
Glazing	43	Double glazing consisting of two panes of minimum 5mm thick glass with at least 100mm air gap and full perimeter <i>acoustically rated seals</i> .
	38	Minimum 14.38mm thick laminated glass, with full perimeter <i>acoustically rated seals</i> ; OR Double glazing consisting of one pane of minimum 5mm thick glass and one pane of minimum 6mm thick glass with at least 44mm air gap, and full perimeter <i>acoustically rated seals</i>
	35	Minimum 10.38mm thick laminated glass, with full perimeter <i>acoustically rated seals</i> .
	32	Minimum 6.38mm thick laminated glass with full perimeter <i>acoustically rated seals</i> .
	27	Minimum 4mm thick glass with full perimeter <i>acoustically rated seals</i>
	24	Minimum 4mm thick glass with standard weather seals

Component of building's external envelope	Minimum R_w	Acceptable forms of construction
External walls	52	Two leaves of clay brick masonry, at least 270mm in total, with subfloor vents fitted with noise attenuators.
	47	Two leaves of clay brick masonry at least 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) 50mm thick mineral insulation or 50mm thick glass wool insulation with a density of 11kg/m³ or 50mm thick polyester insulation with a density of 20kg/m³ in the cavity. OR Two leaves of clay brick masonry at least 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) at least 13mm thick cement render on each face OR Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) Mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m³ positioned between studs; and (iii) One layer of plasterboard at least 13mm thick fixed to outside face of studs. OR Single leaf of minimum 150mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.

Component of building's external envelope	Minimum R_w	Acceptable forms of construction
	41	Two leaves of clay brick masonry at least 110mm thick with cavity not less than 50mm between leaves OR Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m³ positioned between studs; and (iii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Single leaf of brick masonry at least 110mm thick with at least 13mm thick render on each face OR Concrete brickwork at least 110mm thick OR In-situ concrete at least 100mm thick OR Precast concrete at least 100mm thick and without joints.

Component of building's external envelope	Minimum R_w	Acceptable forms of construction
	35	Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally.
Roof	45	Concrete or terracotta tile or sheet metal roof with sarking, <i>acoustically rated plasterboard</i> ceiling at least 13mm thick fixed to ceiling joists, cellulose fibre insulation at least 100mm thick with a density of at least 45kg/m³ in the cavity. OR Concrete or terracotta tile or sheet metal roof with sarking, 2 layers of <i>acoustically rated plasterboard</i> at least 16mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m³ or polyester insulation at least 50mm thick with a density of at least 20kg/m³ in the cavity.
	41	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m³ or polyester insulation at least 50mm thick with a density of at least 20kg/m³ in the cavity. OR Concrete suspended slab at least 100mm thick.
	38	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m³.

Component of building's external envelope	Minimum R_w	Acceptable forms of construction
	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.
Floors	51	Concrete slab at least 150mm thick.
	45	Concrete slab at least 100mm thick OR Tongued and grooved boards at least 19mm thick with: (i) timber joists not less than 175mm x 50mm; and (ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m ³ positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and (iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m ³ laid over entire floor, including tops of joists before flooring is laid; and (iv) secured to battens at least 75mm x 50mm; and (v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.
Entry Doors	35	Solid core timber not less than 45mm thick, fixed so as to overlap the frame or rebate of the frame by not less than 10mm, with full perimeter <i>acoustically rated seals</i> .
	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter <i>acoustically rated seals</i> and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or (ii) acoustically laminated glass not less than 10.38mm thick.

Component of building's external envelope	Minimum R_w	Acceptable forms of construction
	28	Fixed so as to overlap the frame or rebate of the frame, constructed of - (i) Wood, particleboard or blockboard not less than 33mm thick; or (ii) Compressed fibre reinforced sheeting not less than 9mm thick; or (iii) Other suitable material with a mass per unit area not less than 24.4kg/m²; or (iv) Solid core timber door not less than 35mm thick fitted with full perimeter <i>acoustically rated seals</i>.

Attachment 4

*SoundPLAN 8.2 Modelling
Design Horizon Traffic Noise Predictions –
Ground Level QDC MP4.4 Noise Categories*



ATTACHMENT 5

*SoundPLAN 8.2 Modelling
Design Horizon Traffic Noise Predictions –
Upper Level QDC MP4.4 Noise Categories*

