

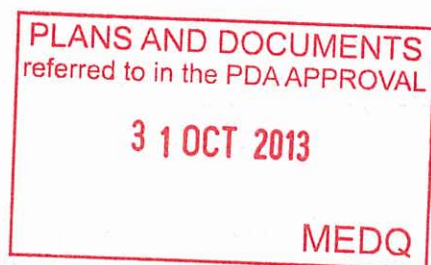
'The Ridge' Residential Development Stage 1

Ripley Road, Ripley

Noise Impact Assessment

6959R01V01
12/08/13

Prepared for
PSA Consulting Australia



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1 Introduction

ASK Consulting Engineers Pty Ltd (ASK) was commissioned by PSA Consulting Australia (PSA) to provide acoustic consultancy services for the proposed residential development to be constructed at Ripley Road, Ripley. This acoustic report is to form part of the Development Application for consideration by Economic Development Queensland (EDQ).

The real property description is Lot 1 on RP114350, Parish of Ipswich, County of Stanley.

The proposed development includes 52 residential lots over a 5.2ha allotment.

The purpose of this report is as follows:

- Outline the relevant project noise criteria.
- Present the results of noise monitoring.
- Predict and assess the road traffic noise impact onto the development.
- Describe noise mitigation requirements, if any.

To aid in the understanding of the terms in this report a glossary is included in **Appendix A**.

2 Study Area Description

The proposed development is to be located at Ripley Road, Ripley to the south of the intersection with Scotts Road. The site location is shown in **Figure 2.1** (source: Google Earth).



Figure 2.1 Site Location

The site is currently vacant and generally consists of sparsely forested land.

The proposed development is surrounded by the following premises:

- Residential premises to the north.
- Ripley Road directly adjacent to the west.
- Bushland directly to the east and south and across Ripley Road to the west.

The proposed development is impacted upon by road traffic noise from Ripley Road and this is required to be considered in the project design.

4 Acoustic Criteria

4.1 Overview

Acoustic criteria for the development will need to address noise intrusion into the development from road traffic noise from Ripley Road.

As noted previously, the development will initially come under the scrutiny of Economic Development Queensland (EDQ), rather than Ipswich City Council (ICC). As such, the development needs to achieve acoustic design criteria to the satisfaction of the EDQ.

The Material Change of Use (MCU) conditions for the development have been supplied to ASK by PSA. Condition 28 of the MCU conditions applies to road traffic noise and references the Department of Transport and Main Roads (TMR) 'Policy Position Statement for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure'. It is proposed to apply these noise criteria in the road traffic noise assessment of the proposed development.

4.2 Queensland Department of Transport and Main Roads (TMR) – Road

The Department of Transport and Main Roads (TMR) issued a Policy Position Statement for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure Version 2.0 dated 10/05/13. This document nominates internal and external criteria limits for the assessment of road traffic noise onto new developments adjacent road corridors. From that document, Table 3: Primary (External) Noise Criteria for New Sensitive Development states for Accommodation Activities:

- All facades:
 - ≤ 60 dBA L10(18hour) facade corrected (measured L90(8hour) free field between 10pm and 6am ≤ 40 dBA), OR:
 - ≤ 63 dBA L10(18hour) facade corrected (measured L90(8hour) free field between 10pm and 6am > 40 dBA)
- Private open space:
 - ≤ 57 dBA L10(18hour) facade corrected (measured L90(18hour) free field between 6am and midnight ≤ 45 dBA), OR:
 - ≤ 60 dBA L10(18hour) facade corrected (measured L90(18hour) free field between 6am and midnight > 45 dBA)

Also from that document, Table 4: Secondary (Internal) Noise Criteria for New Sensitive Development states:

- Accommodation activities (habitable rooms all times): ≤ 35 dBA Leq(1hour) (maximum hour over 24 hours)

These noise criteria will be used in the assessment of the proposed development.

5 Acoustic Measurements

Acoustic measurements consisted of a brief attended noise measurement and noise logging.

5.1 Attended Noise Measurement

An attended noise measurement was undertaken at **Location A** as shown on **Figure 2.1**. **Location A** was located 6m from the edge of Ripley Road and 220m south of the corner of Scotts Road and Ripley Road.

The measurement was undertaken at 3:49pm on Monday 5th of August, 2013, over a 15 minute period using a field and laboratory calibrated Norsonic Nor140 sound level meter. The microphone height was approximately 1.3m above natural ground level and was located in the free field. Weather during the time of monitoring was fine, nil clouds, with a slight breeze from the north-west at approximately 1 to 3 m/s.

The measured noise levels are summarised in **Table 5.1**. The parameters noted in **Table 5.1** are described in the glossary in **Appendix A**.

Table 5.1 Attended Noise Measurement Results at Location A

Date & Time	Period (Minutes)	Results & Notes
3:49pm 05/08/2013	15	Statistical noise levels: L ₁₀ 64 dBA, L _{eq} 59 dBA, L ₉₀ 42 dBA Traffic noise from Ripley Road is the main source of noise Passing cars 63 to 71 dBA Background noise levels 43 to 46 dBA Noise from birds 52 to 54 dBA

5.2 Noise Logging

Noise logging was undertaken at **Location A** as shown on **Figure 2.1**. Logging was undertaken from Monday 5th to Wednesday 7th of August 2013, using a field and laboratory calibrated Rion NL-22 sound level meter. Noise logging was undertaken in the free field.

Weather during the time of monitoring was fine, nil clouds and no rain.

The measured noise levels are shown in **Figure 5.1**. The parameters graphed in **Figure 5.1** are described in the glossary in **Appendix A**.

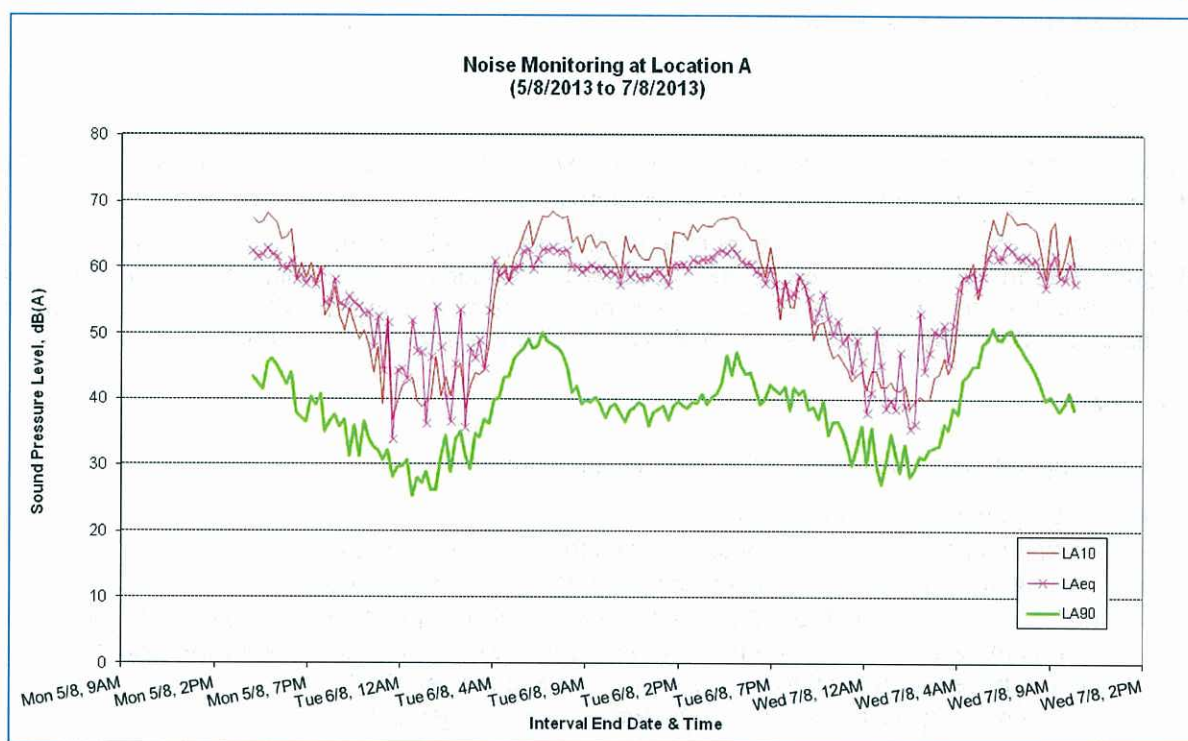


Figure 5.1 Graph of Noise Logging Results at Location A

From the noise logging the statistical results have been summarised in **Table 5.2**.

Table 5.2 Statistical Noise Levels at Location A

Day	Noise Levels, dBA						
	Leq (24 hour)	L10 (18 hour)	L10 (12 hour)	Max Day Leq (1 hour)	Max Night Leq (1 hour)	L90 (8 hour)	L90 (18 hour)
Tuesday 6/08/13	59	61	48	63	62	34	41

From the results in **Figure 5.1** and **Table 5.2** and the observations noted from attended measurements in **Section 5.1** the following comments are made:

- Road traffic on Ripley Road is the dominant noise source.
- From **Figure 5.1**, the noise data indicates that there is an uneven distribution in traffic volume on Ripley Road. Based on the LAeq and LA10 noise data obtained, traffic volumes on Ripley Road appear to be consistent between 5am and 7pm and then decline significantly.
- The L90(8 hour) noise level measured at **Location A** was 34 dBA (see **Table 5.2**) (less than 40 dBA L90(8 hour) corresponding to an external noise limit of ≤ 60 dBA L10(18hour) facade corrected (see **Section 4.2**).
- The L90(18 hour) noise level measured at **Location A** was 41 dBA (see **Table 5.2**) (less than 45 dBA L90(18 hour) corresponding to an external noise limit of ≤ 57 dBA L10(18hour) in private open space areas (see **Section 4.2**).

6 Road Traffic Noise Assessment

6.1 Overview

Road traffic noise has been assessed from Ripley Road onto the proposed development. The relevant assessment criteria are outlined in **Section 4**.

TMR recommends that the prediction of road traffic noise is to be conducted according to the United Kingdom Department of Transport (1988) procedure published as "Calculation of Road Traffic Noise" (CoRTN88). The road traffic noise levels have been predicted using the PEN3D computer model, based on the CoRTN88 traffic noise prediction method and is approved by TMR.

6.2 Data

The following data has been used in the noise calculations:

- Noise source height of 0.5 m.
- Ground contours for the site obtained from Brown Smart Consulting.
- Existing Road width as per site inspection and Google Earth Pro images.
- Traffic data shown in **Table 6.1** has been obtained from PSA for the year 2011, year 2031 and ultimate traffic flow. The traffic data provided, including the growth rate, has been used to determine the traffic flow for the year 2013 and the year 2023.
- The 18-hour traffic flow is taken to be 94% of the average daily traffic flow.
- The road surface for all the roads used in the noise model is dense graded asphalt (DGA).
- Receptor heights used in the model were 1.8m, 4.6m and 7.4m high relative to finished ground level, representing ground, first and second storey receptor heights.
- The CoRTN road traffic noise model predicts the L₁₀(18 hour) noise level.
- A +2.5 dBA facade reflection allowance is included in the road traffic noise level predictions.

Table 6.1 Road Traffic Noise Data for Traffic Modeling

Road	Traffic Volume (AADT)		Speed (km/hr)		Percentage Heavy Vehicles (%HV)	
	Existing 2013	Future 2023	Existing 2013	Future 2023	Existing 2013	Future 2023
Ripley Road	5,562	10,951	70 ¹	80	9.95	9.95

Note: 1. The speed limit on Ripley Road is currently posted as 80 km/hr, however based on observations conducted whilst on-site, road traffic was not observed to be travelling at this speed due to the presence of a construction site along Ripley Road to the south. The speed of road traffic was estimated to be approximately 70 km/hr.

6.3 Verification

The results of the noise survey carried out at **Location A** have been used to verify the road traffic noise model of Ripley Road.

The road traffic verification model uses the 2013 traffic flow, as presented in **Table 6.1** and the current road alignment to determine the L₁₀(18hour). **Table 6.2** compares the results obtained from the noise survey with the calculated results from the computer model.

Table 6.2 Existing and Calculated Road Traffic Noise Level

Receptor Height metres	Measured Noise Level L ₁₀ (18 hour) dBA	Calculated Noise Level L ₁₀ (18 hour) dBA
1.3m	60.9	66.5

Although the road traffic model is not within the ± 2.0 dBA accuracy range typically required for verification, the results have been used since the model is over-predicting the noise levels which will give conservative predictions. The likely reason for the over-prediction of road traffic noise is the uneven distribution in traffic volume on Ripley Road (see **Figure 5.1**). From **Figure 5.1** it can be seen that between 5am and 7pm, the measured L₁₀ noise levels from road traffic is relatively consistent with the calculated L₁₀(18hour) noise level (see **Table 6.2**). However due to the significant decrease in road traffic after 7pm, represented by the drop in the L₁₀ noise level, the measured L₁₀(18hour) noise level at **Location A** is well below the calculated L₁₀(18hour) noise level.

6.4 Assessment

6.4.1 Overview

The road traffic noise levels from Ripley Road for the year 2023 (10 year development horizon as per TMR policy) have been predicted across the proposed development. ASK has been advised by PSA that the development is not to include acoustic barriers within the design in accordance with the Ripley Road Design Guidelines (November 2011) and therefore no barriers have been included in the noise assessment.

ASK has been advised by PSA that in lieu of noise barriers, it is proposed to construct terrace housing (two to three storeys high) on the medium density lot (Lot 52) immediately adjacent to Ripley Road (see **Figure 3.1** and **Appendix B**) to provide screening to the remainder of the development. Terrace housing within this medium density lot will then be designed to achieve internal noise criteria. Residential development may be up to three storeys high on all residential lots.

6.4.2 External Noise Level Assessment

The road traffic noise model constructed for the site has been used to predict the L₁₀(18 hour) noise levels for ground and upper storeys within the site. To represent the attenuation provided by the terrace housing constructed on Lot 52, a barrier was included in the model at a height of 6m. This barrier was positioned through the centre of the lot and included a 5m gap between every 10m barrier length, thus simulating the effective barrier of the terrace housing. The predicted L₁₀(18 hour) noise levels for ground and upper storeys with the effect of the terrace housing on Lot 52 are presented in **Figure 6.1** to **Figure 6.3** against the cadastre outline of the proposed development.

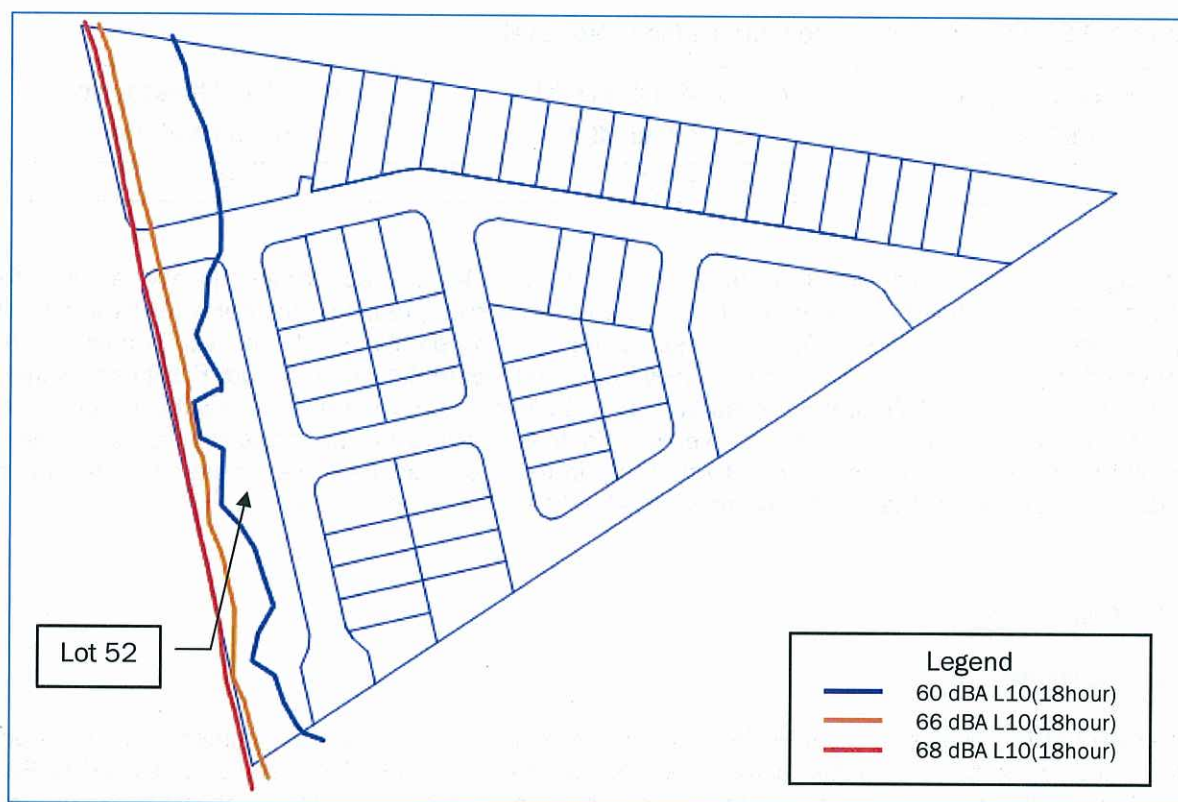


Figure 6.1 Predicted L10(18 hour) Noise Levels for Ground Floor Receptors (1.8m)



Figure 6.2 Predicted L10(18 hour) Noise Levels for First Floor Receptors (4.6m)



Figure 6.3 Predicted L₁₀(18 hour) Noise Levels for Second Floor Receptors (7.4m)

The predicted L₁₀(18 hour) noise levels for ground and upper storeys are presented in **Figure 6.1** to **Figure 6.3** against the cadastre outline of the proposed development. The relevant external noise level criteria is 60 dBA L₁₀(18hour) based on noise logging conducted at **Location A** (see **Table 5.2**), with the predicted 60 dBA L₁₀(18hour) noise level shown as a blue contour line.

Based on the predicted noise contours (see **Figure 6.1** to **Figure 6.3**), the external noise criteria is predicted to be exceeded at Lot 52 (terrace housing) for all receptor heights. However, due to the effective screening provided by the terrace housing, the external noise level criteria is predicted to be achieved at all other lots within Stage 1 of the development with the exception of the third storey of a three-storey development on Lot 20, based on a set-back distance of 6m from the front boundary of the lot.

6.4.3 Internal Noise Assessment

The predicted external L₁₀(18 hour) noise levels for ground and upper storeys are presented within **Figure 6.1** to **Figure 6.3** (orange and red contour lines). Based on the noise contours, the predicted external noise level range (depending on detailed design) at the facade of the terrace housing (Lot 52) for ground and upper floors are as follows:

- Ground Floor: 66 – 68 dBA L₁₀(18 hour)
- First Floor: 68 – 70 dBA L₁₀(18 hour)
- Second Floor: 68 – 70 dBA L₁₀(18 hour)

Similar to TMR's 'Policy Position Statement for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure', the Department of Housing and Public Works

(HPW) Queensland Development Code (QDC) Mandatory Part 4.4 (MP4.4) 'Buildings in transport noise corridors' also provides an internal noise level limit of 35 dBA Leq from road traffic noise. Although QDC MP4.4 is only applicable to state controlled roads (Ripley Road is not TMR controlled) it can be used as a guide with regards to achieving internal noise level criteria through building construction. To achieve the 35 dBA Leq internal noise level criteria, QDC MP4.4 classifies noise exposure into noise categories and provides construction methods for each category to achieve the internal noise limit. The noise categories from QDC MP4.4 are as follows:

- Category 0: ≤ 57 dBA L₁₀(18 hour)
- Category 1: 58 – 62 dBA L₁₀(18 hour)
- Category 2: 63 – 67 dBA L₁₀(18 hour)
- Category 3: 68 – 72 dBA L₁₀(18 hour)
- Category 4: ≥ 73 dBA L₁₀(18 hour)

Based on the predicted noise levels (see **Figure 6.1** to **Figure 6.3**), the relevant noise category for the worst affected facades (facing Ripley Road) on the ground and upper floors using QDC MP4.4 are as follows:

- Ground Floor: Category 2 to Category 3
- First Floor: Category 3
- Second Floor: Category 3

It is necessary to note that these noise categories are applicable only for the worst affected facades (south-west facing towards Ripley Road). The noise impact onto other facades will be less due to angle of view and therefore the resulting noise category would also be lower. It is also noted that the 60 dBA L₁₀(18 hour) noise contour corresponds to QDC MP4.4 Category 1.

The construction requirements for the nominated QDC MP4.4 noise categories (included Category 1) are included in **Appendix C**. In accordance with MP4.4 the construction requirements are to be either (i) using construction materials nominated in MP4.4, as described in **Appendix C Table C.1**; or (ii) using construction materials and methods that meet the minimum acoustic rating (R_w) requirements in MP4.4, as shown in **Appendix C Table C.1**, based on the manufacturers specifications.

ASK do not recommend the application of QDC MP4.4 in this scenario; it has simply been used as guidance with regards to achieving internal noise criteria through facade construction.

To achieve the internal noise level criteria, windows and doors may be required to be closed. Therefore natural ventilation may be required to be substituted in the form of mechanical ventilation for some rooms, in accordance with the Building Code of Australia.

Based on the MP4.4 construction requirements and the predicted external noise levels it is considered that the internal noise level criteria can be achieved. To determine specific construction requirements, a more detailed assessment will be required when design plans are available for the development.

7 Recommendations & Conclusion

A road traffic noise assessment has been conducted for Stage 1 of The Ridge development, proposed to be located off Ripley Road, Ripley Valley. The results and recommendations of the assessment are as follows:

- Based on the predicted noise contours in **Figure 6.1** to **Figure 6.3**, the external noise criteria is predicted to be exceeded at Lot 52 (Terrace Housing) for all receptor heights.
- Based on the predicted noise contours in **Figure 6.1** to **Figure 6.3**, due to the effective screening provided by the terrace housing, the external noise level criteria is predicted to be achieved at all other lots within Stage 1 of the development, with the exception of the third storey of a three-storey development on Lot 20, based on a set-back distance of 6m from the boundary of the lot. To represent the attenuation provided by the terrace housing constructed on Lot 52, a barrier was included in the model at a height of 6m. This barrier was positioned through the centre of the lot and included a 5m gap between every 10m barrier length, thus simulating the effective barrier of the terrace housing.
- Based on the predicted external noise levels and guidance provided by existing noise policy (QDC MP4.4), it is considered that the internal noise level criteria can be achieved with appropriate construction methods. To determine specific construction requirements a more detailed assessment will be required when design plans are available for the development. ASK do not recommend the application of QDC MP4.4 in this scenario; it has simply been used as guidance with regards to achieving internal noise criteria through facade construction.
- To achieve the internal noise level criteria, windows and doors in some dwellings may be required to be closed. Therefore natural ventilation may be required to be substituted in the form of mechanical ventilation for some rooms, in accordance with the Building Code of Australia.

Compliance with the above recommendations is predicted to result in compliance with relevant noise criteria.

Please contact the undersigned with any queries on 07 3255 3355.

Yours faithfully

ASK Consulting Engineers



Mitch Ryan

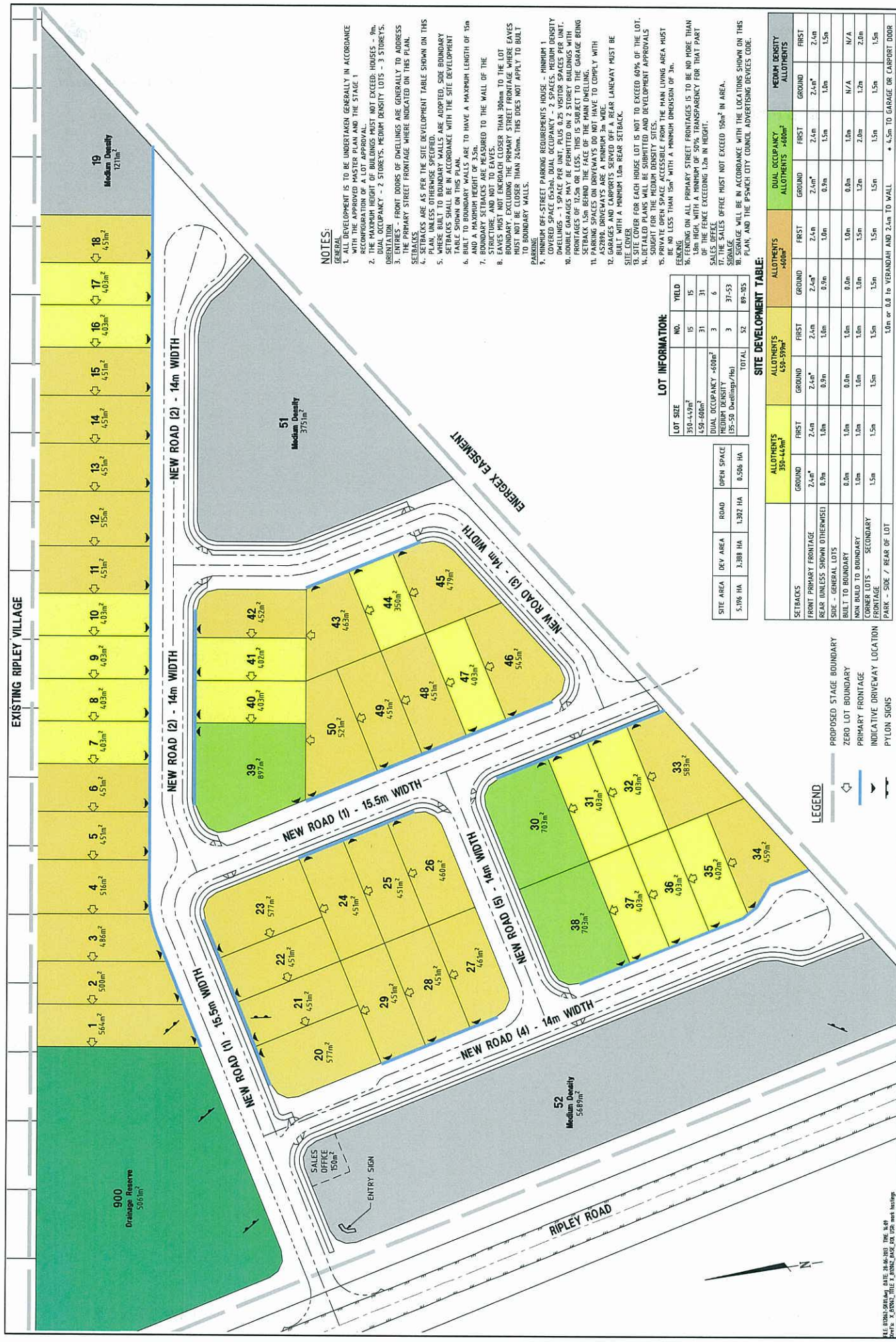
Engineer

Appendix A Glossary

Parameter or Term	Description
dB	The decibel (dB) is the unit measure of sound. Most noises occur in a range of 20 dB (quiet rural area at night) to 120 dB (nightclub dance floor or concert).
dBA	Noise levels are most commonly expressed in terms of the 'A' weighted decibel scale, dBA. This scale closely approximates the response of the human ear, thus providing a measure of the subjective loudness of noise and enabling the intensity of noises with different frequency characteristics (e.g. pitch and tone) to be compared.
Day	The period between 7am and 6pm.
Evening	The period between 6pm and 10pm.
Night	The period between 10pm and 7am.
Free-field	The description of a noise receiver or source location which is away from any significantly reflective objects (e.g. buildings, walls).
L1	The noise level exceeded for 1% of the measurement period.
L10	The noise level exceeded for 10% of the measurement period. It is sometimes referred to as the average maximum noise level.
L90	The noise level exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
Leq	The equivalent continuous sound level, which is the constant sound level over a given time period, which is equivalent in total sound energy to the time-varying sound level, measured over the same time period.
Leq,1hour	As for Leq except the measurement intervals are defined as 1 hour duration.
Lmax	Maximum A-weighted sound pressure level.
Leq(24 hour)	The average Leq noise level over the 24-hour period from midnight to midnight.
L10(18 hour)	The arithmetic average of the one-hour L10 values between 6am and midnight. This parameter is used in the assessment of road traffic noise.
Rw	Weighted Sound Reduction Index – is a single number evaluation of the property of a partition to attenuate sounds. For the majority of partitions, the value of Rw will be similar to the value for STC. Partitions with particularly poor performance at 100 Hz may have lower values for Rw than for STC. Conversely, partitions with poor performance at 4000 Hz may have higher Rw than for STC. (As per AS1276.1-1999).

Appendix B Project Drawings

EXISTING RIPLEY VILLAGE



NOTES:

1. ALL DEVELOPMENT IS TO BE UNDERTAKEN GENERALLY IN ACCORDANCE WITH THE APPROVED MASTER PLAN AND THE STAGE 1 RECONFIGURATION OF A LOT APPROVAL.
2. THE MAXIMUM HEIGHT OF BUILDINGS MUST NOT EXCEED HOUSES - 9m. OCCUPANCY - 2 STOREYS. MEDIUM DENSITY LOTS - 3 STOREYS. ORIENTATION.
3. ENTRIES - FRONT DOORS OF DWELLINGS ARE GENERALLY TO ADDRESS THE PRIMARY STREET FRONTAGE WHERE INDICATED ON THIS PLAN.
4. SETBACKS ARE AS SHOWN ON THE SITE DEVELOPMENT TABLE SHOWN ON THIS PLAN. UNLESS OTHERWISE SPECIFIED, ARE TO BE IN ACCORDANCE WITH THE SITE DEVELOPMENT TABLE SHOWN ON THIS PLAN.
5. WHERE BUILT TO BOUNDARY WALLS ARE ADOPTED, SIDE BOUNDARY SETBACKS SHALL BE IN ACCORDANCE WITH THE SITE DEVELOPMENT TABLE SHOWN ON THIS PLAN.
6. BUILT TO BOUNDARY WALLS ARE TO HAVE A MAXIMUM LENGTH OF 15m.
7. BOUNDARY SETBACKS ARE MEASURED TO THE WALL OF THE STRUCTURE, AND NOT TO EAVES.
8. EAVES MUST NOT ENROACH CLOSER THAN 300mm TO THE LOT BOUNDARY, EXCLUDING THE PRIMARY STREET FRONTAGE WHERE GAVES ARE REQUIRED TO BE NO LESS THAN 2400mm. THIS DOES NOT APPLY TO BUILT TO BOUNDARY WALLS.
9. MINIMUM OFF-STREET PARKING REQUIREMENTS: HOUSE - MINIMUM 1 COVERED SPACE (5.5m). DUAL OCCUPANCY - 2 SPACES. MEDIUM DENSITY - 2 SPACES. UNLESS OTHERWISE SPECIFIED, SPACES PER UNIT.
10. FRONTAGES OF 12.5m OR LESS, THIS IS SUBJECT TO THE GARAGE BEING SETBACK 1.5m BEHIND THE FACE OF THE MAIN DWELLING.
11. PARKING SPACES ON DRIVEWAYS DO NOT HAVE TO COMPLY WITH THE MINIMUM 12.5m FRONTAGE REQUIREMENT.
12. GARAGES AND CARPORTS MUST BE BUILT WITH A MINIMUM 1.0m REAR SETBACK.
13. SITE COVER FOR EACH HOUSE LOT IS NOT TO EXCEED 60% OF THE LOT. UNLESS OTHERWISE SPECIFIED, THIS IS TO BE IN ACCORDANCE WITH THE SITE DEVELOPMENT TABLE SHOWN ON THIS PLAN.
14. SOUPH FOR LOT 31.
15. PRIVATE OPEN SPACE ACCESSIBLE FROM THE MAIN LIVING AREA MUST BE NO LESS THAN 15m² WITH A MINIMUM DIMENSION OF 3m.
16. FENCING ON ALL PRIMARY STREET FRONTAGES IS TO BE NO MORE THAN 1.8m IN HEIGHT.
17. THE SALES OFFICE MUST NOT EXCEED 150m² IN AREA.
18. SIGNAGE MUST BE IN ACCORDANCE WITH THE LOCATIONS SHOWN ON THIS PLAN, AND THE PSNCH CITY COUNCIL ADVERTISING SERVICES CODE.

LOT INFORMATION:

LOT SIZE	NO.	YIELD
350-449m²	15	15
450-600m²	31	31
DUAL OCCUPANCY <600m²	3	6
MEDIUM DENSITY	3	31-53
155-55 Dwellings/Ha	52	89-105
TOTAL		

SITE AREA	DEV AREA	ROAD	OPEN SPACE
5.796 HA	3.389 HA	1.387 HA	0.506 HA

SITE DEVELOPMENT TABLE:

ALLOTMENTS 350-449m²	ALLOTMENTS 450-599m²	ALLOTMENTS >600m²	MEAN DENSITY ALLOTMENTS
GROUND	GROUND	GROUND	GROUND
FRONT	FRONT	FRONT	FRONT
REAR	REAR	REAR	REAR
SETBACKS	SETBACKS	SETBACKS	SETBACKS
FRONT PRIMARY FRONTAGE	FRONT PRIMARY FRONTAGE	FRONT PRIMARY FRONTAGE	FRONT PRIMARY FRONTAGE
REAR UNLESS SHOWN OTHERWISE	REAR UNLESS SHOWN OTHERWISE	REAR UNLESS SHOWN OTHERWISE	REAR UNLESS SHOWN OTHERWISE
SIDE - GENERAL LOTS	SIDE - GENERAL LOTS	SIDE - GENERAL LOTS	SIDE - GENERAL LOTS
BUILT TO BOUNDARY	BUILT TO BOUNDARY	BUILT TO BOUNDARY	BUILT TO BOUNDARY
NON BUILT TO BOUNDARY	NON BUILT TO BOUNDARY	NON BUILT TO BOUNDARY	NON BUILT TO BOUNDARY
CORNER LOTS -	CORNER LOTS -	CORNER LOTS -	CORNER LOTS -
FRONTAGE	FRONTAGE	FRONTAGE	FRONTAGE
PARK - SIDE / REAR OF LOT	PARK - SIDE / REAR OF LOT	PARK - SIDE / REAR OF LOT	PARK - SIDE / REAR OF LOT

LEGEND

- PROPOSED STAGE BOUNDARY
- ZERO LOT BOUNDARY
- PRIMARY FRONTAGE
- INDICATIVE DRIVEWAY LOCATION
- PLYON SIGNS

BROWN
Smart Consulting

E.J. COOPER & SON PTY LTD
THE RIDGE, RIPLEY VALLEY
STAGE 1

PLAN OF DEVELOPMENT
B12062-SK01

DATE: 20/06/2018
TIME: 10:00 AM
BY: [Signature]
FOR: [Signature]

SCALE: 1:1000

PROJECT NO: B12062

MEASURED BY: [Signature]

DATE: 20/06/2018

TIME: 10:00 AM

BY: [Signature]

FOR: [Signature]

DATE: 20/06/2018
TIME: 10:00 AM
BY: [Signature]
FOR: [Signature]

SCALE: 1:1000

PROJECT NO: B12062

MEASURED BY: [Signature]

DATE: 20/06/2018

TIME: 10:00 AM

BY: [Signature]

FOR: [Signature]

Appendix C QDC MP4.4 Noise Category Construction Requirements

Table C.1 Acceptable Forms of Construction

Noise Category	Component of Buildings External Envelope	Minimum Acoustic Rating (R_w)	Acceptable Forms of Construction
3	Glazing	38 (where total area of glazing for a habitable room is greater than 1.8m^2)	Minimum 14.38mm thick laminated glass, with full perimeter acoustically rated seals; OR Double glazing consisting of one pane of minimum 5mm thick glass and one pane of minimum 6mm thick glass with at least 44mm air gap, and full perimeter acoustically rated seals
		35 (where total area of glazing for a habitable room is less than or equal to 1.8m^2)	Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.
	External walls	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/m^3 or 50mm thick polyester insulation with a density of 20kg/m^3 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/m^3 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.

Noise Category	Component of Buildings External Envelope	Minimum Acoustic Rating (R _w)	Acceptable Forms of Construction
	Roof	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/m ³ or polyester insulation at least 50mm thick with a density of at least 20kg/m ³ in the cavity. OR Concrete suspended slab at least 100mm thick.
	Floors	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	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or (ii) acoustically laminated glass not less than 10.38mm thick.
2	Glazing	35 (where total area of glazing for a habitable room is greater than 1.8m ²)	Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.
		32 (where total area of glazing for a habitable room is less than or equal to 1.8m ²)	Minimum 6.38mm thick laminated glass with full perimeter acoustically rated seals.
	External walls	41	Two leaves of clay brick masonry at least 110mm thick with cavity not less than 50mm between leaves OR Single leaf of clay brick masonry at last 110mm thick

Noise Category	Component of Buildings External Envelope	Minimum Acoustic Rating (R _w)	Acceptable Forms of Construction
			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.
	Roof	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/m ³ .
	Floors	45	Concrete slab at least 100mm thick OR Tongued and grooved boards at least 19mm thick with: (i) timber joists not less than 175mm x 50mm; and (ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m³ positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and (iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m³ laid over entire floor, including tops of joists before flooring is laid; and (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	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or (ii) acoustically laminated glass not less than

Noise Category	Component of Buildings External Envelope	Minimum Acoustic Rating (R _w)	Acceptable Forms of Construction
			10.38mm thick.
1	Glazing	27 (where total area of glazing for a habitable room is greater than 1.8m ²)	Minimum 4mm thick glass with full perimeter acoustically rated seals
		24 (where total area of glazing for a habitable room is less than or equal to 1.8m ²)	Minimum 4mm thick glass with standard weather seals
	External walls	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	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.
	Entry doors	28	Fixed so as to overlap the frame or rebate of the frame, constructed of - (i) Wood, particleboard or blockboard not less than 33mm thick; or (ii) Compressed fibre reinforced sheeting not less than 9mm thick; or (iii) Other suitable material with a mass per unit area not less than 24.4kg/m ² ; or (iv) Solid core timber door not less than 35mm thick fitted with full perimeter acoustically rated seals.
0	No additional acoustic treatment required – standard building assessment provisions apply.		