Application of Local Development Plan

Local Development Plan Treendale East

1. Construction on Lots identified on this Local Development Plan to have regard to the Specifications of Quiet House Design Package A

Approval

This LDP has been approved by the Shire of Harvey under Clause 52 of the Planning and Development (Local Planning Schemes) Regulations 2015.

Signature

27/4/2018
Date

LEGEND

LOTS REQUIRING PACKAGE A & NOTIFICATION ON TITLE

QUIET HOUSE DESIGN DEEMED-TO-SATISFY CONSTRUCTIONS FOR PACKAGE A

Area	Orientation to road corridor	Package A
Bedrooms	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] • Rood and Ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard)
	Side-on	• As above, except glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Indoor living and work Areas	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if R_w+C_{tr} 28dB: 60%] [if R_w+C_{tr} 31dB: 80%] • External doors other than glass doors to R_w+C_{tr} 26dB (Table 6.4)
	Side-on	• As above, except the glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Other indoor areas	Any	• No requirements

Alternative construction are acceptable, provided they are supported by a report prepared by a suitably qualified Acoustical Consultant.

QUIET HOUSE DESIGN PACKAGE A SPECIFICATIONS

MINIMUM ACOUSTIC RATING OF GLAZED ELEMENTS

Building Element	Type	Airborne weighted sound reduction rating with traffic correction R_w+C_{tr} dB	Building element Type Airborne weighted sound
Window, uPVC, aluminium or timber frame	Sliding or double hung opening	23	• 4mm monolithic glass
		26	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		29	• Single pane glazing to R_w 36dB • 10mm monolithic (aka float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulating
	Fixed sash, awning or casement type opening	26	• 4mm monolithic glass
		31	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		34	• Single pane glazing to R_w 36dB • 10mm monolithic (a.k.a float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulated glass unit (IGU)
Single external door, aluminium uPVC or timber frame	Fully glazed sliding door	24	• 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		27	• 10mm monolithic or laminated • 10mm toughened safety glass
	Fully glazed hinged door	28	• Certified R_w 31dB acoustically rated door and frame including seals • 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		31	• Certified R_w 34dB acoustically rated door and frame including seals • 10mm monolithic or laminated • 10mm toughened safety glass
	Solid core timber frame, side hinged	26	• Certified R_w 28dB acoustically rated door and frame system including seals • 35mm solid core timber
		30	• Certified R_w 32db acoustically rated door and frame system including seals • 40mm solid core timber without glass insert • 40mm solid core timber with not less than 6mm

MINIMUM ACOUSTIC RATING OF SELECTED EXTERNAL BUILDING EXTERIOR WALLS

Building Element	Type	Rw+Ctr, dB	Example Constructions
External wall	Steel Framed	45	One row of 92mm studs at 600mm centres with - • resilient steel channels fixed to the outside of the studs; and • 9.5mm hardboard or 9mm fibre cement sheeting or 11mm fibre cement weather boards fixed to the outside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 14kg/m³ or • 75mm thick polyester insulation with a density of 14kg/m³, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
			One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • one layer of 19mm board cladding fixed to the outside of the channels; and • 6mm fibre cement sheets fixed to the inside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11 kg/m³ or • 75mm thick polyester insulation with a density of 14 kg/m³, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
	Single leaf masonry, brick veneer	45	• Single leaf of 150mm brick masonry with 13mm cement render on each face.
		50	Single leaf of 90mm clay brick masonry with – • a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and • a cavity of 25mm between leaves; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m³ or 75mm thick polyester insulation with a density of 14kg/m³ positioned between studs; and • one layer of 10mm plasterboard fixed to the inside face.
			Single leaf of 220mm brick masonry with 13mm cement render on each face.
			150mm thick unlined concrete panel.
			200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face.
	Double Brick	45	Two leaves of 90mm clay brick masonry with a 20mm cavity between leaves.
		50	Two leaves of 90mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m³ or 50mm thick polyester insulation with a density of 14 kg/m³ in the cavity; and • Where wall ties are required to connect leaves, the ties are of the resilient type.
			Two leaves of 110mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m³ or 50mm thick polyester insulation with a density of 14 kg/m³ in the cavity.

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LOCAL DEVELOPMENT PLAN

Treendale East

Plan No: 17-000285P-MP-02A

Date: 04.04.2018
Rev: Rev A
Scale: A1 @1:1500, A3 @ 1:3000
Co-ords: MGA
Aerial: N/A

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

TREENDALE EAST

Noise Management Plan

PREPARED FOR TAYCOT

17-000285 | 4 April 2018

Calibre Professional Services Pty Ltd
ABN 55 070 683 037

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
A	31.01.2018	For client review	KS	LG	GB
B	01.02.2018	Amended following review	KS	LG	GB
C	26.02.2018	Amended following comments from Shire	KS	LG	GB
D	04.04.2018	Amended following comments from Shire	KS	LG	GB

Contents

Tables

Figures

Appendices

1 Introduction

Calibre Professional Services Pty Ltd (Calibre) has been engaged by Taycot, Project Managers for Treendale Estate to undertake a Noise Management Plan for the eastern most stage of the Treendale development.

The original lots 9509 and 9527 are subject to WAPC approval 155476. The subject land is bounded by Grand Entrance and the Interim Access Road to the north, Forrest Highway to the east and a Public Open Space (POS) corridor to the south and west. The subject land is shown in *Figure 1* below.

The WAPC approval 155476 allows the creation of 121 lots, ranging in size from 375m² to 724m², access roads and POS areas including an area for a landscaped noise bund adjacent to Forrest Highway. The approved subdivision plan is shown in *Figure 2*.

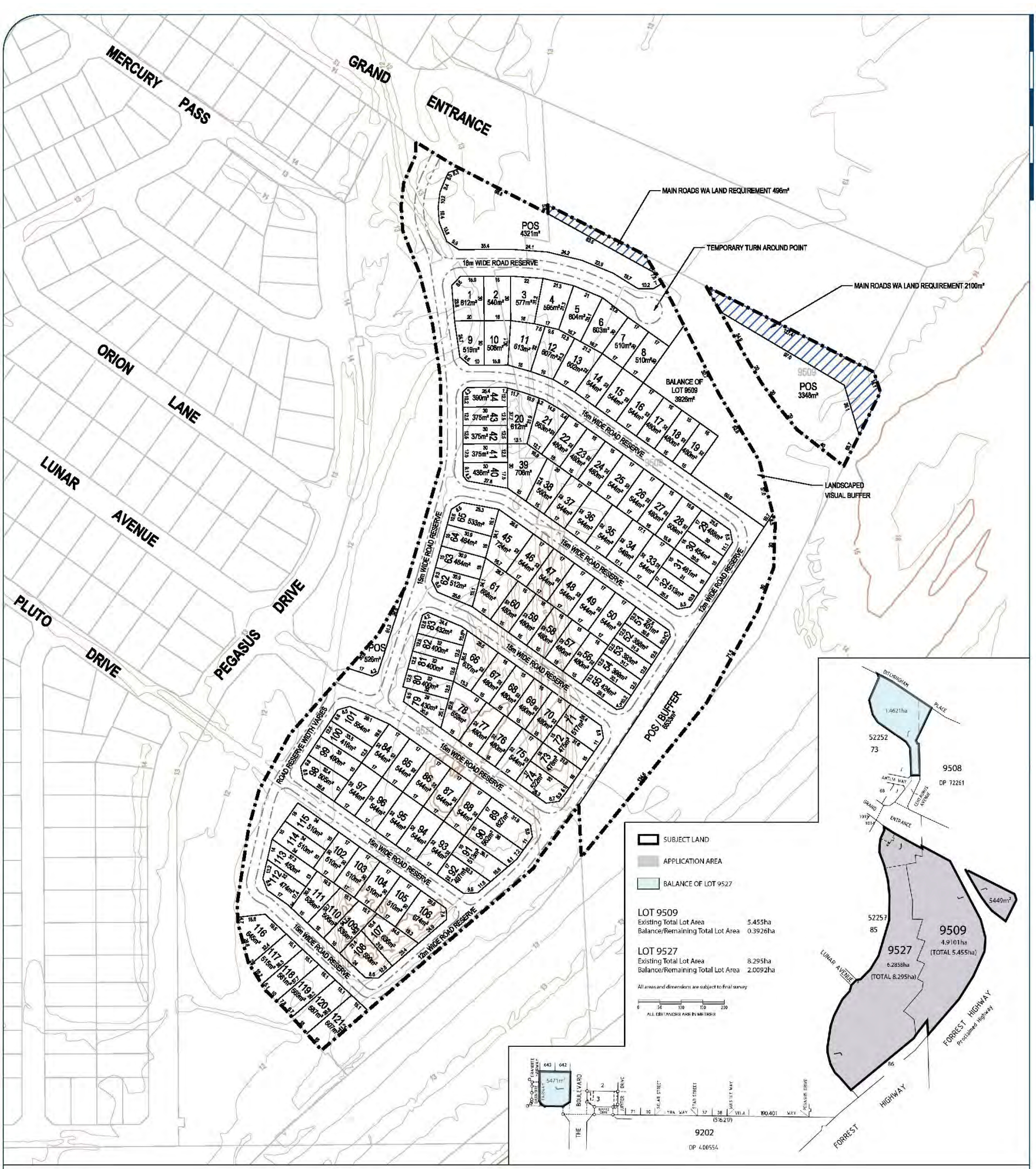
An Acoustic Assessment has been prepared by specialist acoustic consultants, Herring Storer, to comply with the requirements of State Planning Policy 5.4 "*Road and Rail Transport and Freight considerations in Land Use Planning*" (SPP5.4).

Noise modelling has been undertaken as part of the Acoustic Assessment for the noise that would be received within the subdivision from vehicles travelling along the Australind Bypass, and in the future, for the following scenarios:

- Current road network, with Interim Access Road; and

- Future road network, with construction of overpass.

Figure 1 – Subject Land



LEGEND

- EXISTING CADASTRAL BOUNDARY
- EXISTING MAJOR CONTOUR 5m INTERVALS
- EXISTING MINOR CONTOUR 1m INTERVALS
- SUBJECT LAND
- PROPOSED CADASTRAL BOUNDARY
- INDICATIVE ROAD LAYOUT
- FUTURE CADASTRAL BOUNDARY
- MRWA LAND REQUIREMENT

LOT CALCULATIONS

EXISTING NUMBER OF LOTS:	2
PROPOSED NUMBER OF RESIDENTIAL LOTS:	121
PROPOSED NUMBER OF BALANCE LOTS:	2
PROPOSED NUMBER OF POS LOTS:	4
POS AUDIT CALCULATIONS	
SUBJECT LAND AREA	11.7215ha
10% POS REQUIREMENT	1.1721ha
PROPOSED POS AREA	1.4728ha (12.56%)

LOT YIELD TABLE

LOT YIELD			LOT AREA		
Size	No. Lots	% Total Lots	Average Size	% of Total Area	Area
320m² - 449m²	16	13.22%	402m²	10.24%	6434m²
450m² - 499m²	29	23.97%	477m²	22.02%	13835m²
500m² - 549m²	48	39.67%	530m²	40.53%	25466m²
550m² - 599m²	11	9.09%	569m²	9.97%	6267m²
600m² - 699m²	15	12.40%	627m²	14.97%	9406m²
700m² - 899m²	2	1.65%	715m²	2.28%	1430m²
Total Number of Lots	121				

Minimum Lot Size 375m²
Maximum Lot Size 724m²
Average Lot Size 519m²
Total Lot Area 62838m²

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REVISED SUBDIVISION PLAN

Lots 9527 and 9509 Grand Entrance and Pegasus Drive

Plan No: 17-000285P-SU-01D

Date: 31.10.2017
Rev: A
Scale: A1 @1:1250, A3 @ 1:2500
Co-ords: MGA
Aerial: N/A

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

Figure 2 – Approved Subdivision Plan

2 Noise Contour Plan

Noise level modelling was undertaken by Herring Storer as part of the Acoustic Assessment for the subject land.

The modelling determined the noise that would be received within the proposed development from vehicles travelling along Forrest Highway in the future, for the following scenarios :

- Current road network, with Interim Access Road; and

- Future road network, with construction of overpass.

Table 1 below sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development or new major roads and railways assessed under State Planning Policy 5.4 “Road and Rail Transport Noise and Freight Considerations In Land Use Planning” (SPP 5.4).

Table 1 - Outdoor Noise Criteria

Time of day	Noise Target	Noise Limit
Day (6 am–10 pm)	$L_{Aeq(Day)}$ = 55 dB(A)	$L_{Aeq(Day)}$ = 60 dB(A)
Night (10 pm–6 am)	$L_{Aeq(Night)}$ = 50 dB(A)	$L_{Aeq(Night)}$ = 55 dB(A)

Further details regarding the criteria, monitoring and methodology of the modelling can be found in *Appendix 1 – Acoustic Assessment.*

Figures 3a & 3b show noise contours for the current road network.

Figure 4 shows noise contours for the proposed future road network.

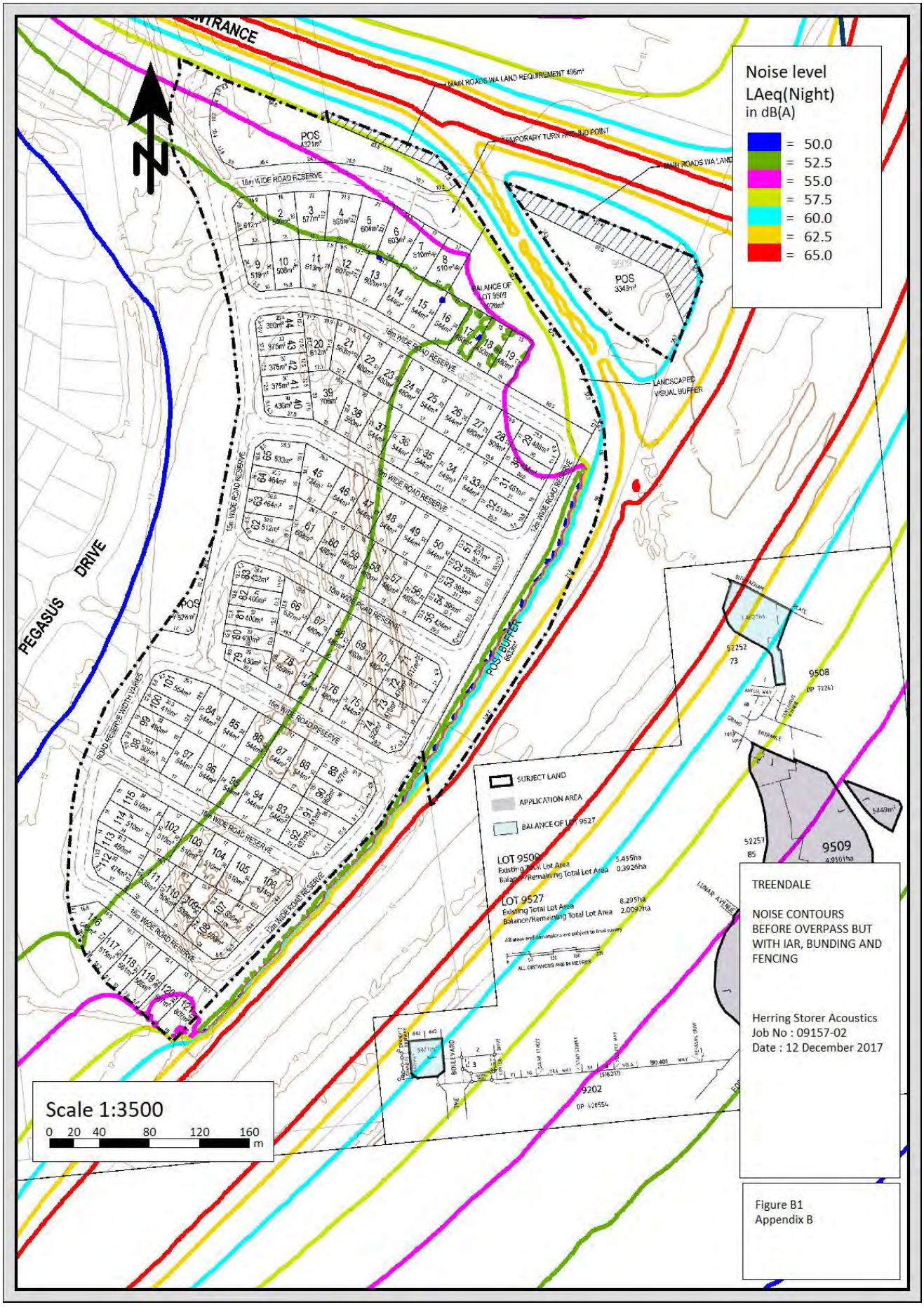

Figure 3a - Noise Contours with current road network

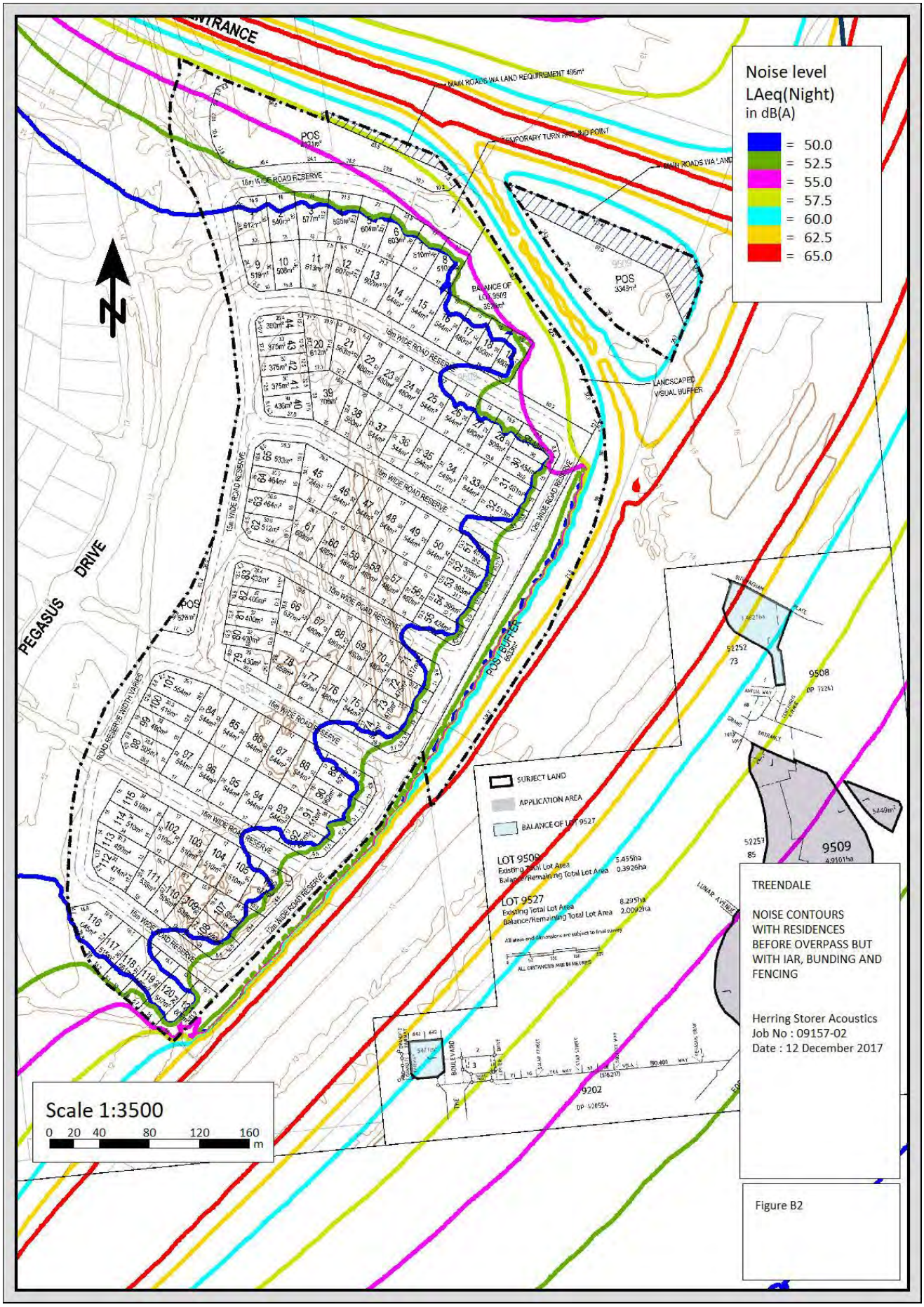

Figure 3b - Noise Contours with current road network

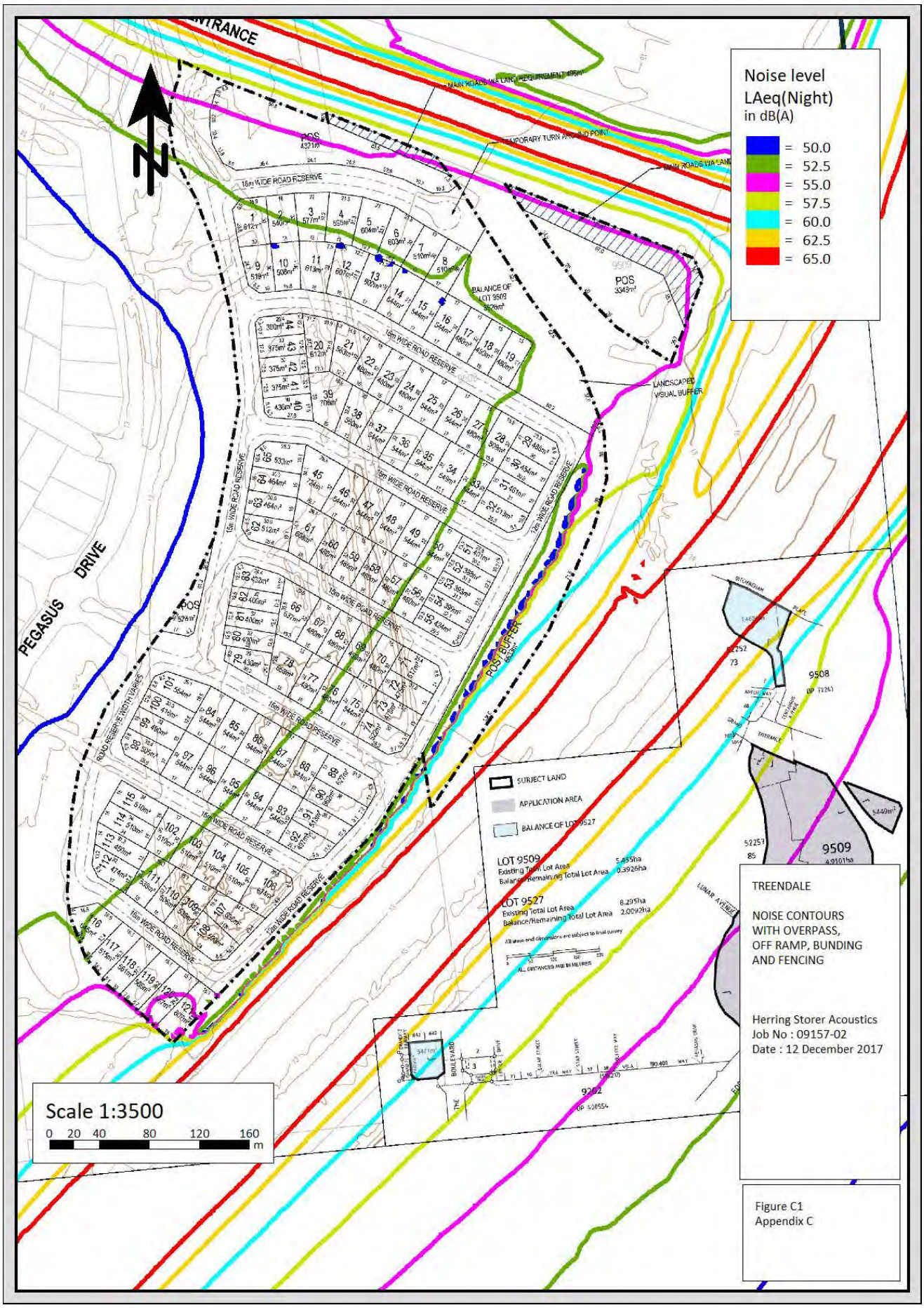

Figure 4 - Noise Contours with proposed future road network

3 Design and Construction Specifications for Noise Mitigation Measures

Noise mitigation works proposed for the Treendale East subdivision to be undertaken by the developers are outlined on *Figure 5* and include the following:

1. **A 3m high landscaped noise bund adjacent to Forrest Highway.**

   The southern portion of the bund on lot 86 has previously been constructed and landscaped as part of the earlier approval. Construction of the remaining portion of the bund will the undertaken as part of the first stage of the current subdivision approval (WAPC 155476).

   Detailed design specifications of the bund are shown in *Figure 6*.

2. **Double Colorbond fencing to screen rear of most northern and southern lots.**

   Lots with rear boundaries facing the Interim Access Road will require the installation of a 2m high double colorbond fence.

   Lots with rear boundaries facing the southern POS will require the installation of a 1.8m high double colorbond fence.

   The location of fencing is shown in *Figure 5*. Fencing will be installed at the time these lots are developed.

   Note: Barriers need to have a minimum density of 15 kg/m². However, it is noted that while a single colorbond fence is not adequate, a double colorbond fence is sufficient to provide the barrier reduction required.

3. **Visual Screening of the Interim Access Road.**

   An area of landscaping is to be planted on the southern edge of the Interim Access Road reserve, within the subject land, to create a visual buffer. Due to the temporary nature of this access it is not intended that this be of high landscaped quality but merely a vegetation screen to minimise the visual impact of the road.

   Planting is to be undertaken as part of stage 1 works.

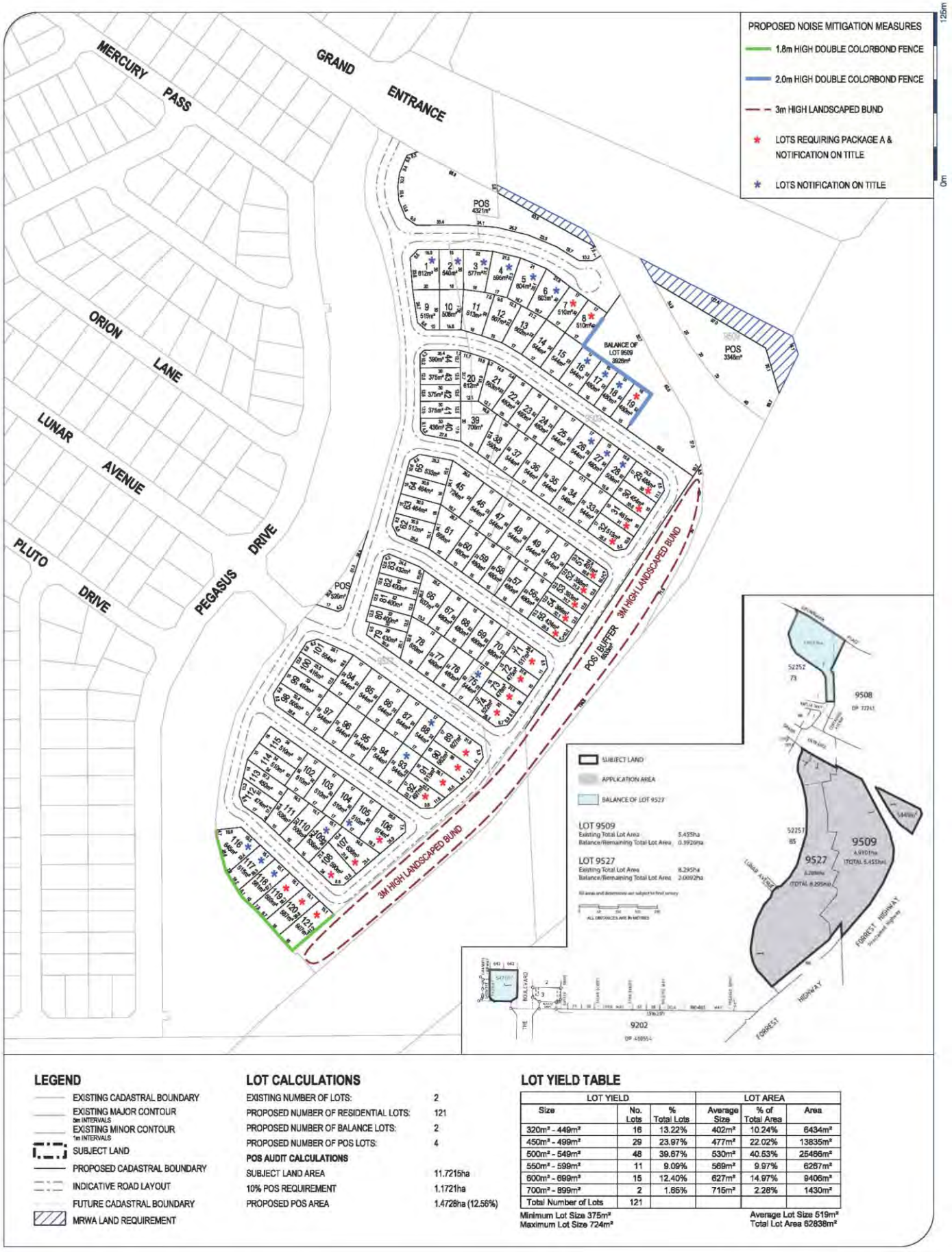

Figure 5 – Location of Noise Mitigation Measures

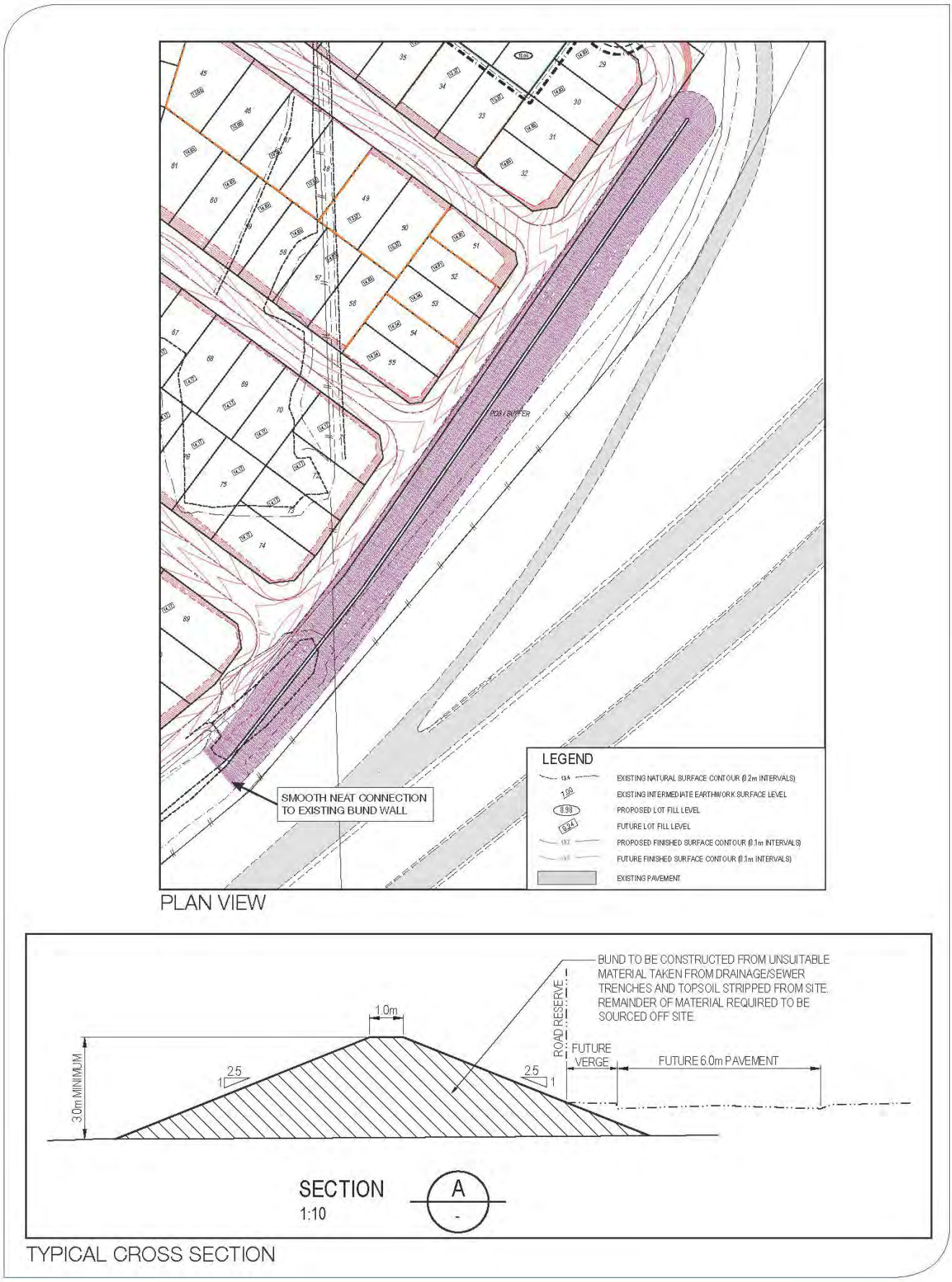

Figure 6 – Specification of Noise Bund

4 Maintenance Arrangements and Responsibilities

The Local Government Guidelines for Subdivisional Development (October 2017) specifies, on practical completion of works, it is the responsibility of the developer to repair any defects resulting in faulty workmanship and/or defective materials for a period of 12 months, known as the defects liability period.

Prior to the expiry of the defects liability period, the developer shall arrange an inspection after ensuring that any defects are repaired. Should the developer delay or defer this process, any defects which arise during the deferment period may be deemed by the Local Government to be a defect under the defects liability period.

The developer shall apply in writing to the Local Government for defects liability release, which will be subject to the effective repair of any defective works.

As per previous stages developed at Treendale, a 2 year defects liability period will apply to any landscaping works that form part of noise mitigation measures.

Installation and maintenance of the noise mitigating Colorbond fencing as shown on *Figure 5* will be the responsibility of the developer until such a time as the lots bounded by this fencing are purchased. The maintenance of the fencing then becomes the responsibility of the lot owner.

5 Quiet House Design Criteria

Details of the SPP 5.4 and the application to this development are outlined in the Acoustic Report at *Appendix A*.

Lots requiring houses to be constructed using the Quiet House Design Criteria Package A are identified on *Figure 5* and the Local Development Plan in *Appendix B*.

A copy of the Quiet House design deemed to satisfy constructions for Package A can be found at *Appendix C*.

It is noted that “Quiet House” Design Packages attached are “Deemed to Satisfy” constructions and alternative constructions would be acceptable, provided they are supported by an acoustic report prepared by a suitably qualified acoustic consultant.

Given the location of the development and the projected market, we understand that 2 storey residences are unlikely, hence the “Quiet House” Design is for single storey residences only. If double storey residences are proposed, then specialist acoustic advice would need to be sought by the proponent.

6 Use of the Quiet House Design Criteria

The requirements of the Quiet House Design Criteria, to be applied at the building licence stage, for those lots identified on the Local Development Plan, is to be implemented by the Shire of Harvey.

A copy of the Local Development Plan can be found at *Appendix B*.

7 Informing Purchasers of the Quiet House Design Criteria

Purchasers will be informed of the Quiet House Design Criteria by an Annexure to the Sales Contract. This will include a copy of the deemed to satisfy construction requirements for Quiet House Design Package A.

An example of the Annexure can be found at *Appendix D*.

Additionally, purchasers will be made aware of potential noise levels with a notification to placed on the certificate(s) of title of the proposed lot(s) (see *Figure 5*) which are identified as exceeding 'Noise Target' levels as determined by Main Roads WA. This notification is to be included on the diagram or plan of survey. The notification is to state as follows:

'The lot/s is/are situated in the vicinity of a transport corridor and is currently affected, or may in the future be affected by transport noise.'

8 Conclusion

Implementation of the provisions in this Noise Management Plan will ensure compliance with SPP 5.4.

Appendix A Acoustic Assessment

LOTS 9527 and 9509 GRAND ENTRANCE & PEGASUS DRIVE, TREENDALE

ACOUSTIC ASSESSMENT

OCTOBER 2017

OUR REFERENCE: 22421-3-09157-02

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
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DOCUMENT CONTROL PAGE

ACOUSTIC ASSESSMENT

TREENDALE

Job No: 09157-02

Document Reference: 22421-3-09157-02

FOR

CALIBRE GROUP

DOCUMENT INFORMATION			
Author:	Tim Reynolds	**Checked By:**	Paul Daly
Date of Issue :	27 October 2017		

REVISION HISTORY

Revision	Description	Date	Author	Checked
1	Include comment on Draft Policy	30/10/17	TR	PLD
2	Revised Subdivisional Plan	12/12/17	TR	PLD

DOCUMENT DISTRIBUTION

Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Calibre Attn : Kylie Shaw Email : Kylie.Shaw@calidregroup.com		✓
1	2	Calibre Attn : Kylie Shaw Email : Kylie.Shaw@calidregroup.com		✓
1	3	TATCOT Attn : Travis Taylor Email : travis@taycot.com.au		✓

CONTENTS

APPENDICIES

EXECUTIVE SUMMARY

Herring Storer Acoustics was commissioned by TAYCOT to update the acoustic assessment of the noise that would be received within the residential development, located at Lots 9527 and 9509 Grand Entrance and Pegasus Drive, Treendale. This assessment was undertaken with respect to achieving compliance with the requirements of State Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations in Land Use Planning"* (SPP5.4).

This update of the acoustic study has been undertaken at the request of the Department of Planning, Lands and Heritage (DPLH). This is to account for a revision in the proposed subdivisional layout to allow for new Interim Access Road, being a slip lane for traffic exiting the Australind Bypass on to Grand Entrance.

We also understand that, although the construction of the proposed Overpass is outside the time frame stipulated in SPP 5.4, the DPLH also require the noise to be received from this scenario (ie after completion of overpass) to be considered in the assessment.

Noise modelling has been undertaken for the noise that would be received within the subdivision from vehicles travelling along the Australind Bypass, in the future, for the following scenarios :

- Current road network, with Interim Access Road; and
- Future road netword, with construction of overpass.

Firstly, we note that the results of the modelling showed the current situation, with the future traffic flows, was the critical situation with respect to compliance with compliance with SPP 5.4. As expected, once the overpass has been constructed, noise received within the proposed subdivision decreases. This is due the barrier afforded by the overpass and the embankments associated with the exit and entry ramps.

As for the previous acoustic study, the 3 metre bund located between the Australind bypass (including the Interim Access Road) is still recommended. Additionally, to achieve compliance at some residences, the following is recommended :

- 2 metre high rear fencing, as outlined in Figure D1 in Appendix D.

- Quiet House Design, as outlined in Figure D1 in Appendix D.

Information regarding "Quiet House" Design Packages, as outlined in the Implementation Guidelines, are contained in Appendix E. It is noted that "Quiet House" Design Packages attached are "Deemed to Satisfy" constructions and alternative constructions would be acceptable, provided they are supported by an acoustic report prepared by a suitably qualified acoustic consultant.

Additional to the above, for those residence receiving noise levels in excess of the "Noise Targets", notifications on titles will also be required. The lots requiring Notifications on Titles are also shown on Figure D1 in Appendix D.

Finally, we note that with the inclusion of the barriers and "Quiet House" design, as outlined in Figure D1 in Appendix D, compliance with the Draft Policy would also be achieved.

1. INTRODUCTION

Herring Storer Acoustics was commissioned by TAYCOT to update the acoustic assessment of the noise that would be received within the residential development located at Lots 9527 and 9509 Grand Entrance and Pegasus Drive, Treendale. This assessment was undertaken with respect to achieving compliance with the requirements of State Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations in Land Use Planning"* (SPP5.4).

We understand that this update of the acoustic study has been undertaken at the request of the Department of Planning, Lands and Heritage (DPLH). This is to account for a revision in the proposed subdivisional layout to allow for new Interim Access Road (IAR), being a slip lane for traffic exiting the Australind Bypass on to Grand Entrance.

We also understand that, although the construction of the proposed Overpass is outside the time frame stipulated in SPP 5.4, the DPLH also require the noise to be received from this scenario (ie after completion of overpass) to be considered in this assessment.

Thus, as part of this this updated assessment, the following was carried out:

- Determine by modelling, the noise that would be received within the subdivision from vehicles travelling along the Australind Bypass, in the future, for the following scenarios :
  - Current road network, with Interim Access Road; and
  - Future road network, with construction of overpass.
- Assess the predicted noise levels for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

For information, the revised subdivisional plan is attached in Appendix A.

2. CRITERIA

2.1 STATE PLANNING POLICY 5.4

The Western Australian Planning Commission (WAPC) released on 22 September 2009 State Planning Policy 5.4 "Road and Rail Transport Noise and Freight Considerations In Land Use Planning" (SPP 5.4). Section 5.3 – Noise Criteria, outlines the acoustic criteria and states:

"5.3 - NOISE CRITERIA

Table 1 sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development or new major roads and railways assessed under this policy.

These criteria do not apply to—

- *proposals for redevelopment of existing major roads or railways, which are dealt with by a separate approach as described in section 5.4.1; and*
- *proposals for new freight handling facilities, for which a separate approach is described in section 5.4.2.*

- *The outdoor noise criteria set out in Table 1 apply to the emission of road and rail transport noise as received at a noise-sensitive land use. These noise levels apply at the following locations—*
- *for new road or rail infrastructure proposals, at 1m from the most exposed, habitable façade of the building receiving the noise, at ground floor level only; and*
- *for new noise-sensitive development proposals, at 1m from the most exposed, habitable façade of the proposed building, at each floor level, and within at least one outdoor living area on each residential lot.*

Further information is provided in the guidelines.

TABLE 1: OUTDOOR NOISE CRITERIA

Time of day	*Noise Target*	*Noise Limit*
Day (6 am–10 pm)	$L_{Aeq(Day)}$ *= 55 dB(A)*	$L_{Aeq(Day)}$ *= 60 dB(A)*
Night (10 pm–6 am)	$L_{Aeq(Night)}$ *= 50 dB(A)*	$L_{Aeq(Night)}$ *= 55 dB(A)*

The 5 dB difference between the outdoor noise target and the outdoor noise limit, as prescribed in Table 1, represents an acceptable margin for compliance. In most situations in which either the noise-sensitive land use or the major road or railway already exists, it should be practicable to achieve outdoor noise levels within this acceptable margin. In relation to greenfield sites, however, there is an expectation that the design of the proposal will be consistent with the target ultimately being achieved. Because the range of noise amelioration measures available for implementation is dependent upon the type of proposal being considered, the application of the noise criteria will vary slightly for each different type. Policy interpretation of the criteria for each type of proposal is outlined in sections 5.3.1 and 5.3.2.

The noise criteria were developed after consideration of road and rail transport noise criteria in Australia and overseas, and after a series of case studies to assess whether the levels were practicable. The noise criteria take into account the considerable body of research into the effects of noise on humans, particularly community annoyance, sleep disturbance, long-term effects on cardiovascular health, effects on children's learning performance, and impacts on vulnerable groups such as children and the elderly. Reference is made to the World Health Organization (WHO) recommendations for noise policies in their publications on community noise and the Night Noise Guidelines for Europe. See the policy guidelines for suggested further reading.

5.3.1 Interpretation and application for noise-sensitive development proposals

In the application of these outdoor noise criteria to new noise-sensitive developments, the objective of this policy is to achieve –

- *acceptable indoor noise levels in noise-sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and*
- *a reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot[1].*

If a noise-sensitive development takes place in an area where outdoor noise levels will meet the noise target, no further measures are required under this policy.

1 For non residential noise-sensitive developments, (e.g. schools and child care centres) consideration should be given to providing a suitable outdoor area that achieves the noise target, where this is appropriate to the type of use.

In areas where the noise target is likely to be exceeded, but noise levels are likely to be within the 5dB margin, mitigation measures should be implemented by the developer with a view to achieving the target levels in a least one outdoor living area on each residential lot[1]. Where indoor spaces are planned to be facing any outdoor area in the margin, noise mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces. In this case, compliance with this policy can be achieved for residential buildings through implementation of the deemed-to-comply measures detailed in the guidelines.

In areas where the outdoor noise limit is likely to be exceeded (i.e. above $L_{Aeq(Day)}$ of 60 dB(A) or $L_{Aeq(Night)}$ of 55 dB(A)), a detailed noise assessment in accordance with the guidelines should be undertaken by the developer. Customised noise mitigation measures should be implemented with a view to achieving the noise target in at least one outdoor living or recreation area on each noise-sensitive lot or, if this is not practicable, within the margin. Where indoor spaces will face outdoor areas that are above the noise limit, mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces, as specified in the following paragraphs.

For residential buildings, acceptable indoor noise levels are $L_{Aeq(Day)}$ of 40 dB(A) in living and work areas and $L_{Aeq(Night)}$ of 35 dB(A) in bedrooms[2]. For all other noise-sensitive buildings, acceptable indoor noise levels under this policy comprise noise levels that meet the recommended design sound levels in Table 1 of Australian Standard AS 2107:2000 Acoustics—Recommended design sound levels and reverberation times for building interiors.

These requirements also apply in the case of new noise-sensitive developments in the vicinity of a major transport corridor where there is no existing railway or major road (bearing in mind the policy's 15-20 year planning horizon). In these instances, the developer should engage in dialogue with the relevant infrastructure provider to develop a noise management plan to ascertain individual responsibilities, cost sharing arrangements and construction time frame.

If the policy objectives for noise-sensitive developments are not achievable, best practicable measures should be implemented, having regard to section 5.8 and the guidelines."

The Policy, under Section 5.7, also provides the following information regarding "Notifications on Titles":

"5.7 - Notification on title

If the measures outlined previously cannot practicably achieve the target noise levels for new noise-sensitive developments, this should be notified on the certificate of title.

Notifications on certificates of title and/or advice to prospective purchasers advising of the potential for noise impacts from major road and rail corridors can be effective in warning people who are sensitive to the potential impacts of transport noise. Such advice can also bring to the attention of prospective developers the need to reduce the impact of noise through sensitive design and construction of buildings and the location of outdoor living areas.

2 For residential buildings, indoor noise levels are not set for utility spaces such as bathrooms. This policy encourages effective "quiet house" design, which positions these non-sensitive spaces to shield the more sensitive spaces from transport noise (see guidelines for further information).

The notification is to ensure that prospective purchasers are advised of –

- *the potential for transport noise impacts; and*
- *the potential for quiet house design requirements to minimise noise intrusion through house layout and noise insulation (see the guidelines).*

Notification should be provided to prospective purchasers and be required as a condition of subdivision (including strata subdivision) for the purposes of noise-sensitive development as well as planning approval involving noise-sensitive development, where noise levels are forecast or estimated to exceed the target outdoor noise criteria, regardless of proposed noise attenuation measures. The requirement for notification as a condition of subdivision and the land area over which the notification requirement applies, should be identified in the noise management plan in accordance with the guidelines.

An example of a standard form of wording for notifications is presented in the guidelines."

2.2 APPROPRIATE CRITERIA

Based on the above, the following criteria are proposed for this development:

External	
Day	Target of 55 dB(A) L_{Aeq} ; Limit of 60 dB(A) L_{Aeq}
Night	Target of 50 dB(A) L_{Aeq} ; Limit of 55 dB(A) L_{Aeq}
Outdoor Living Areas	Maximum of 50 dB(A) $L_{Aeq\ (night\ period)}$
Internal	
Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

We note that there is a Draft State Planning policy currently out for comment. Although not applicable for this development, we note that draft policy applies an outdoor criteria to one outdoor area on each lot and then applies an internal criteria. Thus, under the draft policy, the acoustic criteria would be :

One Outdoor Area	
Day	Maximum of 55 dB(A) L_{Aeq}
Night	Maximum of 50 dB(A) L_{Aeq}
Internal	
Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

Although, the draft policy basically eliminates the Noise Limits, the requirements at an outdoor living area are the same for the current and draft policy. Therefore, for this development, the requirements of the current and draft policies are the same, and compliance with the current will also achieve compliance with the draft policy.

3. NOISE MONITORNG

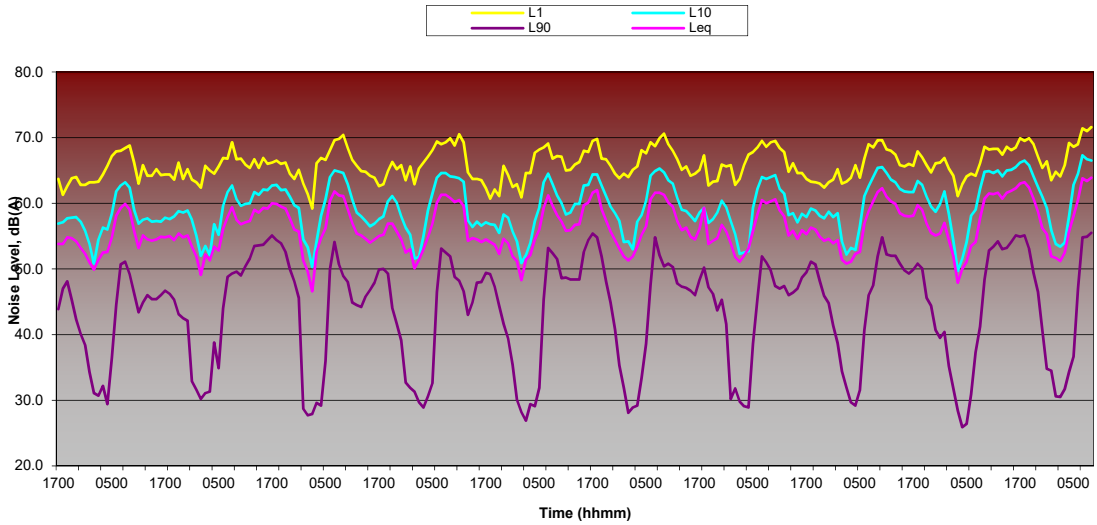
Noise monitoring has been conducted previously along this section of the Australind Bypass. Based on this file data (measured November 2007) the noise levels shown in table 3.1 have been assumed for modelling purposes. Figure 1 details the measured noise levels in graphical form.

TABLE 3.1: SUMMARY OF MEASURED NOISE LEVELS

Parameter	Measured Level dB(A)*	Difference between $L_{10(18hour)}$ and $L_{Aeq(parameter)}$ dB(A)
$L_{A10\ (18\ hour)}$	60.5	N/A
$L_{Aeq,\ day\ (6am\ to\ 10pm)}$	58.3	= $L_{A10\ (18\ hour)}$ – 2.2
$L_{Aeq,\ night\ (10pm\ to\ 6am)}$	54.8	= $L_{A10(18\ hour)}$ – 5.7

* It is normal practice to quote decibels to the nearest whole number. Fractions are retained here to minimise any cumulative rounding error.

Figure 1: Measured Traffic Noise Levels from Australind Bypass



The above parameters are :

L_{A10} The noise level exceeded for 10% of the time (in this instance, the noise level exceeded for 6 minutes in each 1-hour period).

L_{Aeq} The energy equivalent noise level for the 1-hour period. A single number value that expresses the time-varying sound level for the 1 hour period as though it were a constant sound level with the same total sound energy as the time-varying level.

4. METHODOLOGY

To determine the noise received within the proposed subdivision from the Australind Bypass, acoustic modelling was carried out using SoundPlan, using the *Calculation of Road Traffic Noise* (CoRTN)[3] algorithms.

The input data for the model included:

- Traffic volumes supplied by MRWA as listed in Table 4.1;
- Other traffic data as listed in Table 4.1;
- A +2.5 dB adjustment to allow for façade reflection.

TABLE 4.1 – NOISE MODELLING INPUT DATA

Parameter	Australind Bypass	Interim Access Road	Grand Entrance Overpass
Traffic flows for 2031	31,500 vpd	2,200vpd	11,000 vpd
Percentage traffic 0600 – 2400 hours	90%	90%	90%
Heavy Vehicles (%)	10%	10%	10%
Future Speed (km/hr)	80 km/h	60 km/hr	80km/h
Receiver Level (m)	+1.5 above ground		
Façade Correction	+ 2.5 dB(A)		
Road Surface	Chip seal		

We note that once the overpass is constructed, the road surface of the overpass and exit / entry ramps would be Dense Graded Asphalt, however, to be conservative, chip seal road surfacing was used.

From the results of the noise monitoring, the difference between the $L_{Aeq,Day}$ and $L_{Aeq,Night}$ was 3.5 dB(A). Thus, with the difference being less than 5 dB(A), the night period is the critical period with regards to compliance with the requirements of SPP 5.4. Therefore, modelling was only undertaken for the night period.

Based on future traffic flows and the above information, modelling was undertaken for the following situations and scenarios :

Current Road Network, with IAR

A1 - With 3m bunding and fencing, as shown in Figure D1 attached in Appendix D.
A2 - As for scenario A1, but with residence included.

Future Road Network with Overpass

B1 - With 3m bunding and fencing, as shown in Figure D1 attached in Appendix D.

The noise contours for the current road network are attached in Appendix B, with the noise contours for the future road network attached in Appendix C.

3 *Calculation of Road Traffic Noise* UK Department of Transport 1987

5. DISCUSSION / RECOMMENDATIONS

Under the Western Australian Planning Commission (WAPC) Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations in Land Use Planning"* the following external criteria are listed:

"Noise Limits"
$L_{Aeq(Day)}$ of 60 dB(A); and
$L_{Aeq(Night)}$ of 55 dB(A).

As external noise levels exceed the "Noise Target" noise levels, then the residential premises should be designed to comply with the following internal noise levels:

INTERNAL
$L_{Aeq(Day)}$ of 40 dB(A) in living and work areas; and
$L_{Aeq(Night)}$ of 35 dB(A) in bedrooms.

We also note that under the SPP5.4, noise mitigation measures should be implemented with a view to achieve, in at least one outdoor area, the L_{Aeq} of 50 dB(A) noise level for the night period.

For information, we note that under the draft policy, for this development, the base requirements would be to achieve compliance with the L_{Aeq} of 50 dB(A) noise level for the night period at an outdoor area and internal criteria listed above. Therefore, for this development, the requirements of the current and draft policies are the same, and compliance with the current will also achieve compliance with the draft policy.

Firstly, it is noted that once the overpass is constructed, noise received within the proposed subdivision will drop. This is due the barrier afforded by the overpass and the embankments associated with the exit and entry ramps. For information, noise contours with the future overpass are attached in Appendix D. Thus, the critical situation for compliance is that for the future traffic flows under the current road network.

As for the previous acoustic study, the 3 metre bund located between the Australind bypass (and now including the Interim Access Road) is still recommended. Additionally, to achieve compliance at the residences located at the northern end of the development, adjacent to Grand Entrance, the following is recommended :

- 2 metre high rear fencing, as outlined in Figure D1 in Appendix D.

- Quiet House Design, as outlined in Figure D1 in Appendix D.

Information regarding "Quiet House" Design Packages, as outlined in the Implementation Guidelines, are contained in Appendix E.

It is also noted, that additional to the above for those residence receiving noise levels in excess of the "Noise Targets", notifications on titles will also be required. Lots requiring notifications are also shown on Figure D1 in Appendix D.

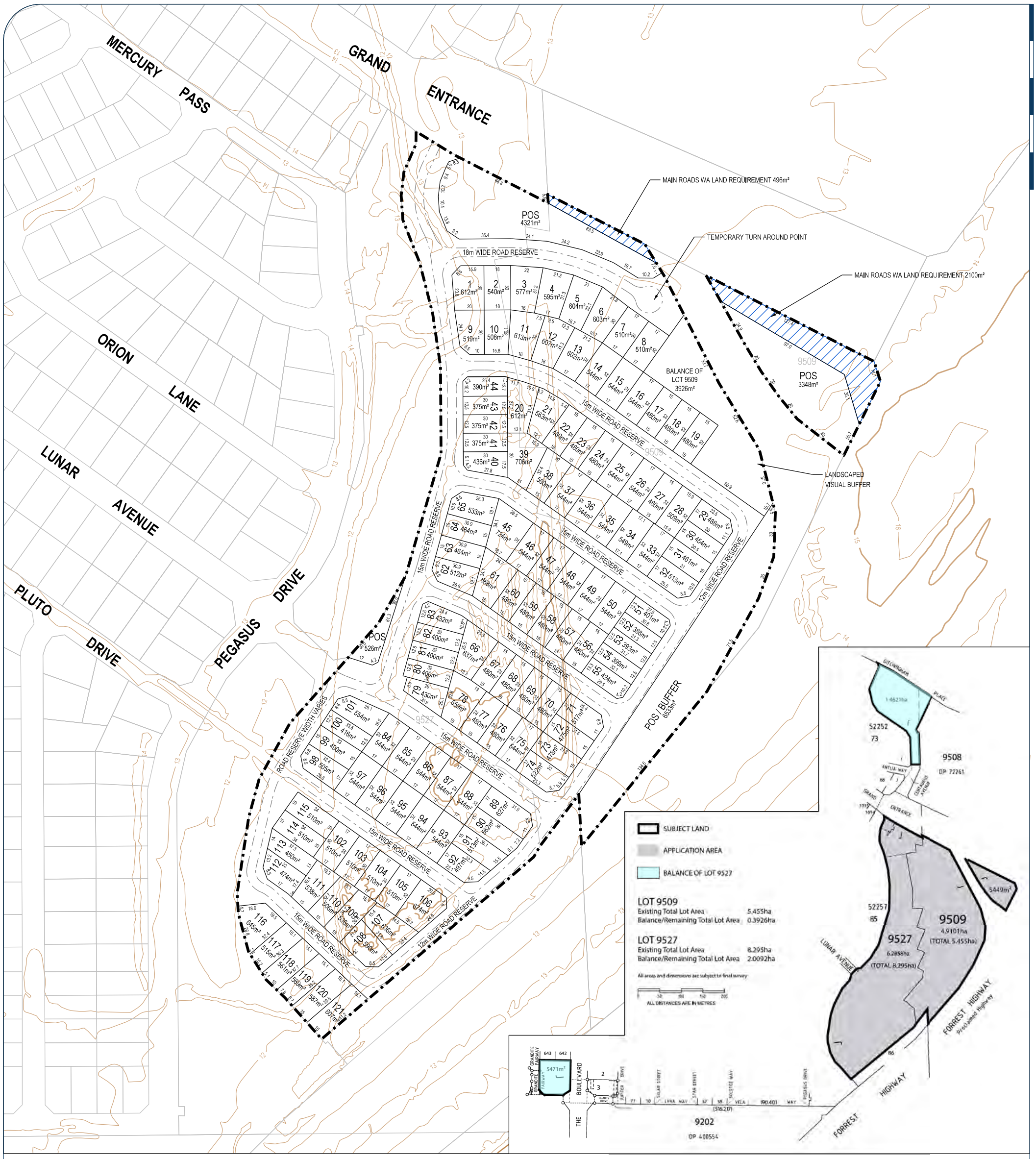
It is noted that “Quiet House” Design Packages attached are “Deemed to Satisfy” constructions and alternative constructions would be acceptable, provided they are supported by an acoustic report prepared by a suitably qualified acoustic consultant.

Given the location of the development and the projected market, we understand that 2 storey residences are unlikely, hence the “Quiet House” Design is for single storey residences only. If double storey residences are proposed, then specialist acoustic advice would need to be sought by the proponent.

Note : For this development, barriers need to have a minimum density of 15 kg/m^2. However, it is noted that while a single colorbond fence is not adequate, a double colorbond fence is sufficient to provide the barrier reduction required.

APPENDIX A

PROPOSED SUBDIVISION



LEGEND

- EXISTING CADASTRAL BOUNDARY
- EXISTING MAJOR CONTOUR 5m INTERVALS
- EXISTING MINOR CONTOUR 1m INTERVALS
- SUBJECT LAND
- PROPOSED CADASTRAL BOUNDARY
- INDICATIVE ROAD LAYOUT
- FUTURE CADASTRAL BOUNDARY
- MRWA LAND REQUIREMENT

LOT CALCULATIONS

EXISTING NUMBER OF LOTS:	2
PROPOSED NUMBER OF RESIDENTIAL LOTS:	121
PROPOSED NUMBER OF BALANCE LOTS:	2
PROPOSED NUMBER OF POS LOTS:	4
POS AUDIT CALCULATIONS	
SUBJECT LAND AREA	11.7215ha
10% POS REQUIREMENT	1.1721ha
PROPOSED POS AREA	1.4728ha (12.56%)

LOT YIELD TABLE

LOT YIELD			LOT AREA		
Size	No. Lots	% Total Lots	Average Size	% of Total Area	Area
320m² - 449m²	16	13.22%	402m²	10.24%	6434m²
450m² - 499m²	29	23.97%	477m²	22.02%	13835m²
500m² - 549m²	48	39.67%	530m²	40.53%	25466m²
550m² - 599m²	11	9.09%	569m²	9.97%	6267m²
600m² - 699m²	15	12.40%	627m²	14.97%	9406m²
700m² - 899m²	2	1.65%	715m²	2.28%	1430m²
Total Number of Lots	121				

Minimum Lot Size 375m²
Maximum Lot Size 724m²

Average Lot Size 519m²
Total Lot Area 62838m²

calibre CONSULTING

Calibre Consulting (Aust) Pty Ltd
Unit 5, 53 Victoria Street
Bunbury WA 6230
Ph 08 9791 4411
www.calibreconsulting.co

REVISED SUBDIVISION PLAN

Lots 9527 and 9509 Grand Entrance and Pegasus Drive

Plan No: 17-000285P-SU-01D

Date:	31.10.2017
Rev:	A
Scale:	A1 @1:1250, A3 @ 1:2500
Co-ords:	MGA
Aerial:	N/A

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

APPENDIX B

NOISE CONTOURS - CURRENT ROAD NETWORK

Noise level
LAeq(Night)
in dB(A)

= 50.0
= 52.5
= 55.0
= 57.5
= 60.0
= 62.5
= 65.0

MAIN ROADS WA LAND REQUIREMENT 495m²

TEMPORARY TURN AROUND POINT

MAIN ROADS WA LAND

POS
4321m²

16m WIDE ROAD RESERVE

BALANCE OF LOT 9509
6276m²

POS
3348m²

LANDSCAPED VISUAL BUFFER

PEGASUS DRIVE

15m WIDE ROAD RESERVE

12m WIDE ROAD RESERVE

POS
526m²

POS / BUFFER
6623m²

SUBJECT LAND

APPLICATION AREA

BALANCE OF LOT 9527

LOT 9509
Existing Total Lot Area 5.455ha
Balance/Remaining Total Lot Area 0.3926ha

LOT 9527
Existing Total Lot Area 8.295ha
Balance/Remaining Total Lot Area 2.0092ha

All areas and dimensions are subject to final survey

ALL DISTANCES ARE IN METRES

9508
DP 72261

9509
4.9101ha

9202
DP 400554

Scale 1:3500
0 20 40 80 120 160 m

TREENDALE

NOISE CONTOURS
BEFORE OVERPASS BUT
WITH IAR, BUNDING AND
FENCING

Herring Storer Acoustics
Job No : 09157-02
Date : 12 December 2017

Figure B1
Appendix B

Noise level
LAeq(Night)
in dB(A)

= 50.0
= 52.5
= 55.0
= 57.5
= 60.0
= 62.5
= 65.0

MAIN ROADS WA LAND REQUIREMENT 495m²

TEMPORARY TURN AROUND POINT

MAIN ROADS WA LAND

POS
1121m²

16m WIDE ROAD RESERVE

POS
3348m²

BALANCE OF LOT 9509

LANDSCAPED VISUAL BUFFER

15m WIDE ROAD RESERVE

12m WIDE ROAD RESERVE

POS
526m²

POS/BUFFER
6523m²

PEGASUS DRIVE

ROAD RESERVE WIDTH VARIES

SUBJECT LAND

APPLICATION AREA

BALANCE OF LOT 9527

LOT 9509
Existing Total Lot Area 5.455ha
Balance/Remaining Total Lot Area 0.3926ha

LOT 9527
Existing Total Lot Area 8.295ha
Balance/Remaining Total Lot Area 2.0092ha

All areas and dimensions are subject to final survey

ALL DISTANCES ARE IN METRES

52252
73

9508
DP 72261

52257
85

9509
4.9101ha

5449m²

9202
DP 400554

LUNAR AVENUE

BOULEVARD

Scale 1:3500
0 20 40 80 120 160 m

TREENDALE

NOISE CONTOURS
WITH RESIDENCES
BEFORE OVERPASS BUT
WITH IAR, BUNDING AND
FENCING

Herring Storer Acoustics
Job No : 09157-02
Date : 12 December 2017

Figure B2

APPENDIX C

NOISE CONTOURS - FUTURE ROAD NETWORK

Noise level
LAeq(Night)
in dB(A)

= 50.0
= 52.5
= 55.0
= 57.5
= 60.0
= 62.5
= 65.0

MAIN ROADS WA LAND REQUIREMENT 495m²

TEMPORARY TURN AROUND POINT

MAIN ROADS WA LAND

POS 4321m²

16m WIDE ROAD RESERVE

POS 3343m²

BALANCE OF LOT 9509 3676m²

LANDSCAPED VISUAL BUFFER

PEGASUS DRIVE

POS 526m²

15m WIDE ROAD RESERVE

12m WIDE ROAD RESERVE

POS / BUFFER 663m²

SUBJECT LAND

APPLICATION AREA

BALANCE OF LOT 9527

LOT 9509
Existing Total Lot Area 5.455ha
Balance/Remaining Total Lot Area 0.3926ha

LOT 9527
Existing Total Lot Area 8.295ha
Balance/Remaining Total Lot Area 2.0092ha

All areas and dimensions are subject to final survey

ALL DISTANCES ARE IN METRES

Scale 1:3500
0 20 40 80 120 160 m

TREENDALE

NOISE CONTOURS
WITH OVERPASS,
OFF RAMP, BUNDING
AND FENCING

Herring Storer Acoustics
Job No : 09157-02
Date : 12 December 2017

Figure C1
Appendix C

APPENDIX D

NOISE BUND / FENCES AND LOTS REQUIRING QUIET HOUSE DESIGN AND NOTIFICATIONS

GRAND ENTRANCE

MAIN ROADS WA LAND REQUIREMENT 495m²

POS 4321m²

16m WIDE ROAD RESERVE

Lot requiring Notifications on Titles

Lot requiring Package A Quiet House Design and Notifications on Titles

BALANCE OF LOT 9509 3926m²

POS 3343m²

LANDSCAPED VISUAL BUFFER

Lot requiring Notifications on Titles

Lot requiring Package A Quiet House Design and Notifications on Titles

15m WIDE ROAD RESERVE

12m WIDE ROAD RESERVE

PEGASUS DRIVE

ROAD RESERVE WIDTH VARIES

POS 6853m²

Lot requiring Notifications on Titles

Signs and symbols

- 1.8m High Fence
- 2m High Fencel
- 3m High Bund

SUBJECT LAND

APPLICATION AREA

BALANCE OF LOT 9527

LOT 9509		
Existing Total Lot Area		5.455ha
Balance/Remaining Total Lot Area		0.3926ha
LOT 9527		
Existing Total Lot Area		8.295ha
Balance/Remaining Total Lot Area		2.0092ha

All areas and dimensions are subject to final survey

0 50 100 150 200

ALL DISTANCES ARE IN METRES

9508 DP 72261

9202 DP 400554

BOULEVARD

TREENDALE

NOISE MITIGATION BUND AND FENCING

LOTS REQUIRING QUIET HOUSE DESIGN AND / OR NOTIFICATIONS ON TITLES

Herring Storer Acoustics
Job No : 09157-02
Date : 12 December 2017

Scale 1:3500

0 20 40 80 120 160 m

Figure D1

APPENDIX E

PACKAGE A QUIET HOUSE DESIGN

QUIET HOUSE DESIGN DEEMED-TO-SATISFY CONSTRUCTIONS FOR PACKAGE A

Area	Orientation to road corridor	Package A
Bedrooms	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] • Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard)
	Side-on	•As above, except glazing Rw+Ctr values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Indoor living and work Areas	Facing	• Walls to Rw+Ctr 45dB • Windows and external door systems: Minimum Rw+Ctr 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if Rw+Ctr 28dB: 60%] [if Rw+Ctr 31dB: 80%] • External doors other than glass doors to Rw+Ctr 26dB (Table 6.4)
	Side-on	• As above, except the glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Other indoor areas	Any	• No requirements

Alternative constructions are acceptable, provided they are supported by a report prepared by a suitably qualified Acoustical Consultant.

MINIMUM ACOUSTIC RATING OF SELECTED EXTERNAL BUILDING EXTERIOR WALLS

Building Element	Type	$R_w + C_{tr}$,dB	Example Constructions
External wall	Steel framed	45	One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • 9.5mm hardboard or 9mm fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or • 75mm thick polyester insulation with a density of 14kg/m3, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
			One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • one layer of 19mm board cladding fixed to the outside of the channels; and • 6mm fibre cement sheets fixed to the inside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11 kg/m3 or • 75mm thick polyester insulation with a density of 14 kg/m3, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
	Single leaf masonry, brick veneer	45	• Single leaf of 150mm brick masonry with 13mm cement render on each face.
		50	Single leaf of 90mm clay brick masonry with – • a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and • a cavity of 25mm between leaves; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or 75mm thick polyester insulation with a density of 14kg/m3 positioned between studs; and • one layer of 10mm plasterboard fixed to the inside face.
			Single leaf of 220mm brick masonry with 13mm cement render on each face.
			150mm thick unlined concrete panel.
			200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face.
	Double brick	45	Two leaves of 90mm clay brick masonry with a 20mm cavity between leaves.
		50	Two leaves of 90mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 14 kg/m3 in the cavity; and • Where wall ties are required to connect leaves, the ties are of the resilient type.
			Two leaves of 110mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 14 kg/m3 in the cavity.

MINIMUM ACOUSTIC RATING OF GLAZED ELEMENTS

Building Element	Type	Airborne weighted sound reduction rating with traffic correction R_w+C_{tr}, dB	Building element Type Airborne weighted sound
Window, uPVC, aluminium or timber frame	Sliding or double hung opening	23	• 4mm monolithic glass
		26	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		29	• Single pane glazing to Rw 36dB • 10mm monolithic (aka float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulating
	Fixed sash, awning or casement type opening	26	• 4mm monolithic glass
		31	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		34	• Single pane glazing to R_w 36dB • 10mm monolithic (a.k.a. float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulated glass unit (IGU)
Single external door, aluminium uPVC or timber frame	Fully glazed sliding door	24	• 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		27	• 10mm monolithic or laminated • 10mm toughened safety glass
	Fully glazed hinged door	28	• Certified R_w 31dB acoustically rated door and frame including seals • 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		31	• Certified R_w 34dB acoustically rated door and frame including seals • 10mm monolithic or laminated • 10mm toughened safety glass
	Solid core timber frame, side hinged	26	• Certified R_w 28dB acoustically rated door and frame system including seals • 35mm solid core timber
		30	• Certified R_w 32dB acoustically rated door and frame system including seals • 40mm solid core timber without glass insert • 40mm solid core timber with not less than 6mm

Appendix B Local Development Plan

Application of Local Development Plan

Local Development Plan Treendale East

1. Construction on Lots identified on this Local Development Plan to have regard to the Specifications of Quiet House Design Package A

Approval

This LDP has been approved by the Shire of Harvey under Clause 52 of the Planning and Development (Local Planning Schemes) Regulations 2015.

Signature _____ Date _____

LEGEND

LOTS REQUIRING PACKAGE A & NOTIFICATION ON TITLE

QUIET HOUSE DESIGN PACKAGE A SPECIFICATIONS

MINIMUM ACOUSTIC RATING OF GLAZED ELEMENTS

Building Element	Type	Airborne weighted sound reduction rating with traffic correction R_w+C_{tr} dB	Building element Type Airborne weighted sound
Window, uPVC, aluminium or timber frame	Sliding or double hung opening	23	• 4mm monolithic glass
		26	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		29	• Single pane glazing to R_w 36dB • 10mm monolithic (aka float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulating
	Fixed sash, awning or casement type opening	26	• 4mm monolithic glass
		31	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		34	• Single pane glazing to R_w 36dB • 10mm monolithic (a k.a float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulated glass unit (IGU)
Single external door, aluminium uPVC or timber frame	Fully glazed sliding door	24	• 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		27	• 10mm monolithic or laminated • 10mm toughened safety glass
	Fully glazed hinged door	28	• Certified R_w 31dB acoustically rated door and frame including seals • 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		31	• Certified R_w 34dB acoustically rated door and frame including seals • 10mm monolithic or laminated • 10mm toughened safety glass
	Solid core timber frame, side hinged	26	• Certified R_w 28dB acoustically rated door and frame system including seals • 35mm solid core timber
		30	• Certified R_w 32db acoustically rated door and frame system including seals • 40mm solid core timber without glass insert • 40mm solid core timber with not less than 6mm

MINIMUM ACOUSTIC RATING OF SELECTED EXTERNAL BUILDING EXTERIOR WALLS

Building Element	Type	Rw+Ctr, dB	Example Constructions
External wall	Steel Framed	45	One row of 92mm studs at 600mm centres with - • resilient steel channels fixed to the outside of the studs; and • 9.5mm hardboard or 9mm fibre cement sheeting or 11mm fibre cement weather boards fixed to the outside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 14kg/m³ or • 75mm thick polyester insulation with a density of 14kg/m³, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
			One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • one layer of 19mm board cladding fixed to the outside of the channels; and • 6mm fibre cement sheets fixed to the inside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11 kg/m³ or • 75mm thick polyester insulation with a density of 14 kg/m³, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
	Single leaf masonry brick veneer	45	• Single leaf of 150mm brick masonry with 13mm cement render on each face.
		50	Single leaf of 90mm clay brick masonry with – • a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and • a cavity of 25mm between leaves; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m³ or 75mm thick polyester insulation with a density of 14kg/m³ positioned between studs; and • one layer of 10mm plasterboard fixed to the inside face.
			Single leaf of 220mm brick masonry with 13mm cement render on each face.
			150mm thick unlined concrete panel.
			200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face.
	Double Brick	45	Two leaves of 90mm clay brick masonry with a 20mm cavity between leaves.
		50	Two leaves of 90mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m³ or 50mm thick polyester insulation with a density of 14 kg/m³ in the cavity; and • Where wall ties are required to connect leaves, the ties are of the resilient type.
			Two leaves of 110mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m³ or 50mm thick polyester insulation with a density of 14 kg/m³ in the cavity.

QUIET HOUSE DESIGN DEEMED-TO-SATISFY CONSTRUCTIONS FOR PACKAGE A

Area	Orientation to road corridor	Package A
Bedrooms	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] • Rood and Ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard)
	Side-on	• As above, except glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Indoor living and work Areas	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if R_w+C_{tr} 28dB: 60%] [if R_w+C_{tr} 31dB: 80%] • External doors other than glass doors to R_w+C_{tr} 26dB (Table 6.4)
	Side-on	• As above, except the glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Other indoor areas	Any	• No requirements

Alternative construction are acceptable, provided they are supported by a report prepared by a suitably qualified Acoustical Consultant.

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LOCAL DEVELOPMENT PLAN

Treendale East

Plan No: 17-000285P-MP-02A

Date: 04.04.2018
Rev: Rev A
Scale: A1 @1:1500, A3 @ 1:3000
Co-ords: MGA
Aerial: N/A

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

150m
0m

Appendix C Quiet House Construction Package A

QUIET HOUSE DESIGN DEEMED-TO-SATISFY CONSTRUCTIONS FOR PACKAGE A

Area	Orientation to road corridor	Package A
Bedrooms	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] • Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard)
	Side-on	•As above, except glazing Rw+Ctr values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Indoor living and work Areas	Facing	• Walls to Rw+Ctr 45dB • Windows and external door systems: Minimum Rw+Ctr 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if Rw+Ctr 28dB: 60%] [if Rw+Ctr 31dB: 80%] • External doors other than glass doors to Rw+Ctr 26dB (Table 6.4)
	Side-on	• As above, except the glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Other indoor areas	Any	• No requirements

Alternative constructions are acceptable, provided they are supported by a report prepared by a suitably qualified Acoustical Consultant.

MINIMUM ACOUSTIC RATING OF SELECTED EXTERNAL BUILDING EXTERIOR WALLS

Building Element	Type	$R_w + C_{tr}$,dB	Example Constructions
External wall	Steel framed	45	One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • 9.5mm hardboard or 9mm fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or • 75mm thick polyester insulation with a density of 14kg/m3, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
			One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • one layer of 19mm board cladding fixed to the outside of the channels; and • 6mm fibre cement sheets fixed to the inside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11 kg/m3 or • 75mm thick polyester insulation with a density of 14 kg/m3, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
	Single leaf masonry, brick veneer	45	• Single leaf of 150mm brick masonry with 13mm cement render on each face.
		50	Single leaf of 90mm clay brick masonry with – • a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and • a cavity of 25mm between leaves; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or 75mm thick polyester insulation with a density of 14kg/m3 positioned between studs; and • one layer of 10mm plasterboard fixed to the inside face.
			Single leaf of 220mm brick masonry with 13mm cement render on each face.
			150mm thick unlined concrete panel.
			200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face.
	Double brick	45	Two leaves of 90mm clay brick masonry with a 20mm cavity between leaves.
		50	Two leaves of 90mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 14 kg/m3 in the cavity; and • Where wall ties are required to connect leaves, the ties are of the resilient type.
			Two leaves of 110mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 14 kg/m3 in the cavity.

MINIMUM ACOUSTIC RATING OF GLAZED ELEMENTS

Building Element	Type	Airborne weighted sound reduction rating with traffic correction R_w+C_{tr}, dB	Building element Type Airborne weighted sound
Window, uPVC, aluminium or timber frame	Sliding or double hung opening	23	• 4mm monolithic glass
		26	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		29	• Single pane glazing to Rw 36dB • 10mm monolithic (aka float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulating
	Fixed sash, awning or casement type opening	26	• 4mm monolithic glass
		31	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		34	• Single pane glazing to R_w 36dB • 10mm monolithic (a.k.a. float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulated glass unit (IGU)
Single external door, aluminium uPVC or timber frame	Fully glazed sliding door	24	• 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		27	• 10mm monolithic or laminated • 10mm toughened safety glass
	Fully glazed hinged door	28	• Certified R_w 31dB acoustically rated door and frame including seals • 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		31	• Certified R_w 34dB acoustically rated door and frame including seals • 10mm monolithic or laminated • 10mm toughened safety glass
	Solid core timber frame, side hinged	26	• Certified R_w 28dB acoustically rated door and frame system including seals • 35mm solid core timber
		30	• Certified R_w 32dB acoustically rated door and frame system including seals • 40mm solid core timber without glass insert • 40mm solid core timber with not less than 6mm

Appendix D Annexure to the Sales Contract

TREENDALE

ANNEXURE 'H'
LOCAL DEVELOPMENT PLAN AND QUIET HOUSE DESIGN CRITERIA
(STAGE 12)

This is the Annexure marked "H" referred to in the OFFER AND ACCEPTANCE dated the ……day of ……

20…… made between ……..……..……..…..("the buyer/s")

and **TREENDALE NOMINEES PTY LTD (ACN 153 291 653) of PO Box 559, Bunbury WA 6231**

The Buyer to purchase Lot ……

QUIET HOUSE DESIGN DEEMED-TO-SATISFY CONSTRUCTIONS FOR PACKAGE A

Area	Orientation to road corridor	Package A
Bedrooms	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] • Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard)
	Side-on	•As above, except glazing Rw+Ctr values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Indoor living and work Areas	Facing	• Walls to Rw+Ctr 45dB • Windows and external door systems: Minimum Rw+Ctr 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if Rw+Ctr 28dB: 60%] [if Rw+Ctr 31dB: 80%] • External doors other than glass doors to Rw+Ctr 26dB (Table 6.4)
	Side-on	• As above, except the glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%
	Opposite	• No requirements
Other indoor areas	Any	• No requirements

Alternative constructions are acceptable, provided they are supported by a report prepared by a suitably qualified Acoustical Consultant.

INITIALS .....

INITIALS .....

MINIMUM ACOUSTIC RATING OF SELECTED EXTERNAL BUILDING EXTERIOR WALLS

Building Element	Type	$R_w + C_{tr}$,dB	Example Constructions
External wall	Steel framed	45	One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • 9.5mm hardboard or 9mm fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or • 75mm thick polyester insulation with a density of 14kg/m3, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
			One row of 92mm studs at 600mm centres with – • resilient steel channels fixed to the outside of the studs; and • one layer of 19mm board cladding fixed to the outside of the channels; and • 6mm fibre cement sheets fixed to the inside of the channels; and • 75mm thick glass or mineral wool insulation with a density of 11 kg/m3 or • 75mm thick polyester insulation with a density of 14 kg/m3, positioned between the studs; and • two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
	Single leaf masonry, brick veneer	45	• Single leaf of 150mm brick masonry with 13mm cement render on each face.
		50	Single leaf of 90mm clay brick masonry with – • a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and • a cavity of 25mm between leaves; and • 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or 75mm thick polyester insulation with a density of 14kg/m3 positioned between studs; and • one layer of 10mm plasterboard fixed to the inside face.
			Single leaf of 220mm brick masonry with 13mm cement render on each face.
			150mm thick unlined concrete panel.
			200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face.
	Double brick	45	Two leaves of 90mm clay brick masonry with a 20mm cavity between leaves.
		50	Two leaves of 90mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 14 kg/m3 in the cavity; and • Where wall ties are required to connect leaves, the ties are of the resilient type.
			Two leaves of 110mm clay brick masonry with – • a 50mm cavity between leaves; and • 50mm thick glass wool insulation with a density of 11kg/m3 or 50mm thick polyester insulation with a density of 14 kg/m3 in the cavity.

INITIALS .....

INITIALS .....

MINIMUM ACOUSTIC RATING OF GLAZED ELEMENTS

Building Element	Type	Airborne weighted sound reduction rating with traffic correction R_w+C_{tr}, dB	Building element Type Airborne weighted sound
Window, uPVC, aluminium or timber frame	Sliding or double hung opening	23	• 4mm monolithic glass
		26	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		29	• Single pane glazing to Rw 36dB • 10mm monolithic (aka float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulating
	Fixed sash, awning or casement type opening	26	• 4mm monolithic glass
		31	• Single pane glazing to R_w 33dB • 6mm monolithic or laminated glass • 6mm toughened safety glass • '6-12-6' double insulated glass unit (IGU)
		34	• Single pane glazing to R_w 36dB • 10mm monolithic (a.k.a. float) glass • 10mm laminated or toughened safety glass • 6mm-12mm-10mm double insulated glass unit (IGU)
Single external door, aluminium uPVC or timber frame	Fully glazed sliding door	24	• 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		27	• 10mm monolithic or laminated • 10mm toughened safety glass
	Fully glazed hinged door	28	• Certified R_w 31dB acoustically rated door and frame including seals • 6mm monolithic or laminated • 5 or 6mm toughened safety glass
		31	• Certified R_w 34dB acoustically rated door and frame including seals • 10mm monolithic or laminated • 10mm toughened safety glass
	Solid core timber frame, side hinged	26	• Certified R_w 28dB acoustically rated door and frame system including seals • 35mm solid core timber
		30	• Certified R_w 32dB acoustically rated door and frame system including seals • 40mm solid core timber without glass insert • 40mm solid core timber with not less than 6mm

_____	_____	_____
Buyer	Buyer	Date
_____	_____	_____
Witness	Witness	Date
_____	_____	_____
Seller	Seller	Date
_____	_____	_____
Witness	Witness	Date

INITIALS ……... INITIALS ……..….

CONTACT US

CALIBRE

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