



Vipac Engineers and Scientists Limited

Level 2, 146 Leichhardt Street, Spring Hill, QLD 4000, Australia

PO Box 47, Spring Hill, Qld, 4000 Australia

t. +61 7 3377 0400 | f. +61 7 3377 0499 | e. brisbane@vipac.com.au

w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

Vipac Engineers & Scientists


Mirvac Pacific Pty Ltd

Gainsborough Greens Precinct 3.1

Noise Impact Assessment

70Q-19-0117-TRP-8550792-0

24 April 2019

Report Title: Noise Impact Assessment Job Title: Gainsborough Greens Precinct 3.1		
DOCUMENT NO: 70Q-19-0117-TRP-8550792-0 PREPARED FOR: Mirvac Pacific Pty Ltd Level 17, 123 Eagle Street Brisbane, Queensland, 4000, Australia CONTACT: Belinda Ryan Tel: 07 38595808 Fax: 07 3859 5975	REPORT CODE: TRP PREPARED BY: Vipac Engineers and Scientists Limited Level 2, 146 Leichhardt Street, Spring Hill, QLD 4000, Australia Tel: +61 7 3377 0400 Fax: +61 7 3377 0499	
PREPARED BY: Author:	 Arnold Mafu Project Engineer	Date: 24 Apr 2019
REVIEWED BY: Reviewer:	 Jackson Yu Principal Acoustic Consultant, Team Leader	Date: 24 Apr 2019
AUTHORISED BY:	 Jackson Yu Principal Acoustic Consultant, Team Leader	Date: 24 Apr 2019
REVISION HISTORY		
Revision No.	Date Issued	Reason/Comments
0	24/04/2019	Initial Issue
1		
2		
DISTRIBUTION		
Copy No. _____	Location	
1	Project	
2	Client (PDF Format)	Uncontrolled Copy
3		
KEYWORDS:		

NOTE: This is a controlled document within the document control system. If revised, it must be marked SUPERSEDED and returned to the Vipac QA Representative. This document contains commercial, conceptual and engineering information that is proprietary to Vipac Engineers & Scientists Ltd. We specifically state that inclusion of this information does not grant the Client any license to use the information without Vipac's written permission. We further require that the information not be divulged to a third party without our written consent

TABLE OF CONTENTS

1	INTRODUCTION	4
2	PROPOSED DEVELOPMENT AND SURROUNDING AREA	4
3	NOISE CRITERIA.....	6
3.1	State Development Assessment Provisions	6
3.2	Queensland Development Code MP4.4	6
3.3	Environmental Protection (Noise) Policy 2008	7
4	EXISTING NOISE ENVIRONMENT	7
5	NOISE IMPACT ASSESSMENT	9
5.1	Traffic Noise Modelling	9
5.1.1	Modelling Methodology and Traffic Data.....	9
5.1.2	Traffic Noise Model Validation.....	10
5.2	Predicted Noise Levels	10
5.2.1	Predicted Traffic Noise Levels for Outdoor Spaces with Existing Barrier	10
5.2.2	Predicted façade Corrected Traffic Noise Levels with Existing Barrier	10
5.3	Building Construction Acoustic Requirements.....	10
5.3.1	Glazing Requirements	10
5.3.2	External Wall Requirements	11
5.3.3	Ceiling/Roof Requirements.....	12
5.3.4	Ventilation Requirements	12
6	NOISE IMPACTS FROM SERVICE STATION	13
7	CONCLUSION AND RECOMMENDATIONS	13
APPENDIX A	SITE LAYOUT	14
APPENDIX B	NOISE MEASUREMENT RESULTS AND WEATHER OBSERVATIONS	18
APPENDIX C	PREDICTED TRAFFIC NOISE LEVELS FOR OUTDOOR SPACES	21
APPENDIX D	PREDICTED TRAFFIC NOISE LEVELS AND MP4.4 CATEGORIES	25
APPENDIX E	NOISE CONTOUR MAPS	32

1 INTRODUCTION

Vipac Engineers & Scientists Ltd (Vipac) was commissioned by Mirvac Pacific Pty Ltd to carry out a noise impact assessment for Precinct 3.1 of the proposed Gainsborough Greens residential development located on Gainsborough Drive, Pimpama (Lot 805 on SP291377). This noise assessment includes the following:

- Description of the development;
- Discussion of the applicable noise criteria;
- Prediction of traffic noise levels for the lots in the proposed development;
- Prediction of noise levels at the development from other noise sources;
- Assessment of predicted noise levels against applicable noise criteria;
- Discussion of noise mitigation if required; and
- Recommendations and conclusion.
-

2 PROPOSED DEVELOPMENT AND SURROUNDING AREA

The proposed residential development is located on Gainsborough Drive, Pimpama in an area zoned Medium Density Residential under the City of Gold Coast City Plan. The location of the proposed development is presented in Figure 2-1. Site layout drawings are presented in Appendix A.



Figure 2-1: Proposed Site Location (City of Gold Coast City Plan)

The surrounding land uses are as follows:

- North – Gainsborough Greens Golf Course;
- East – Existing detached residential dwellings ,vacant land;
- South – 2m acoustic barrier along the site boundary to the south adjacent Yawalpah Road, Existing detached residential dwellings; and
- West – Vacant land, 7-Eleven Pimpama, Bridgestone Select Tyre and Auto, McDonalds Pimpama.

The proposed development comprises of 124 lots and the site layout and 2m acoustic barrier are presented in Figure 2-2.

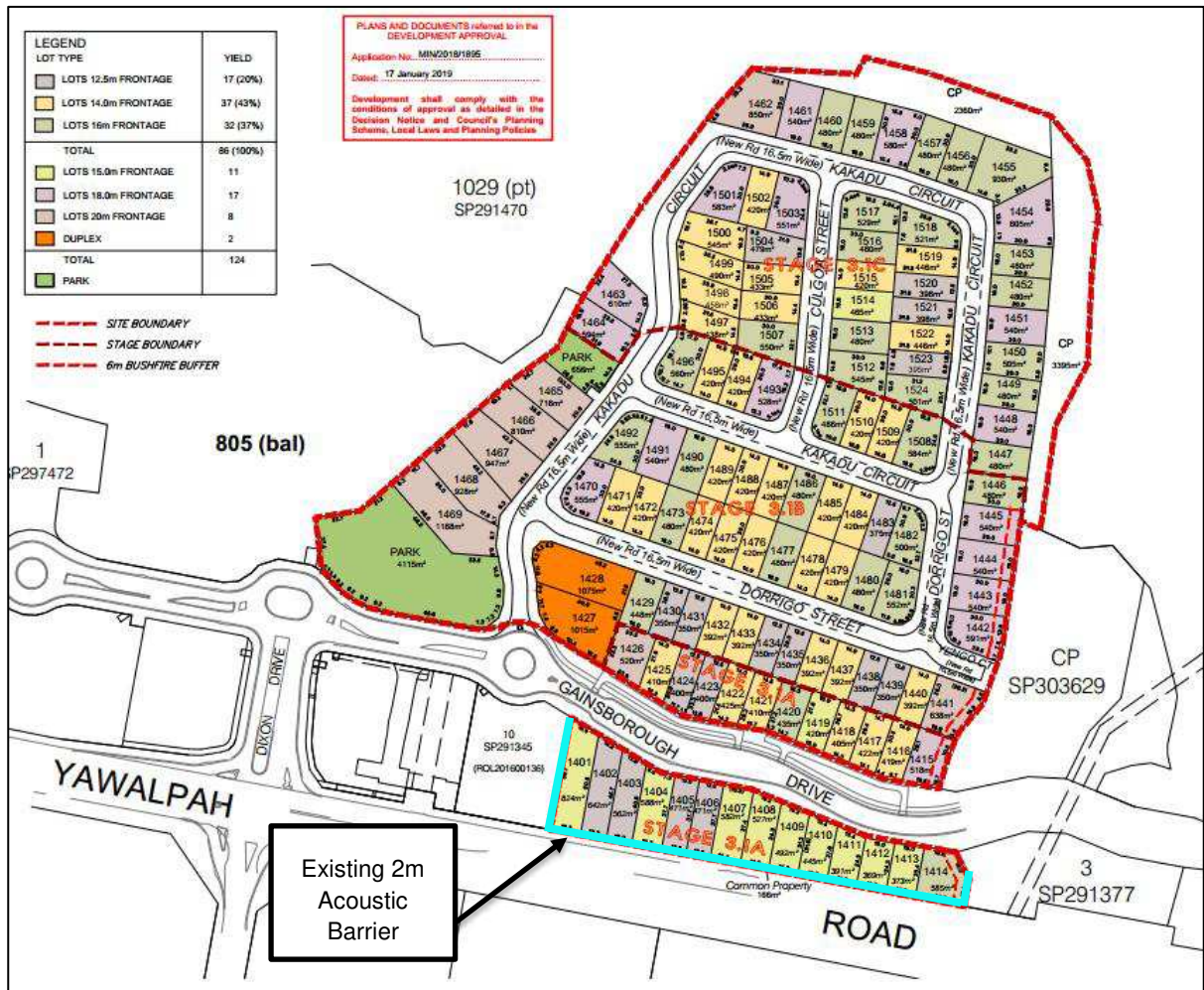


Figure 2-2: Site Layout and Existing 2m Acoustic Barrier

3 NOISE CRITERIA

The following noise policies have been adopted for this assessment of this development:

- State Development Assessment Provisions” (SDAP) State Code 1;
- Queensland Development Code MP4.4; and
- Environmental Protection (Noise) Policy 2008 (EPP (Noise) 2008).

3.1 STATE DEVELOPMENT ASSESSMENT PROVISIONS

The Department of State Development Infrastructure, Local Government and Planning’s “State Development Assessment Provisions” (SDAP) (version 2.1 published on 1st August 2017) has been adopted to assess traffic noise impacts on the development. The development has been assessed according to noise limits for residences in a transport corridor, due to its proximity to Yawalpah Road to the south of the development. Noise limits from the relevant section of SDAP’s State Code 1 is presented in Table 3-1.

Table 3-1: SDAP State Code 1 Noise Criteria

Performance Outcomes	Acceptable Outcomes
PO24 Development involving an accommodation activity or land for a future accommodation activity minimises noise intrusion from a state-controlled road or type 1 multi-modal corridor in outdoor spaces for passive recreation.	<p>AO24.1 A noise barrier or earth mound is provided which is designed, sited and constructed:</p> <ol style="list-style-type: none"> 1. To meet the following external noise criteria in outdoor spaces for passive recreation: <ol style="list-style-type: none"> a. ≤ 57 dB(A) $L_{10(18\text{ hour})}$ free field (measured $L_{90(18\text{ hour})}$ free field between 6 am and 12 midnight ≤ 45 dB(A)) b. ≤ 60 dB(A) $L_{10(18\text{ hour})}$ free field (measured $L_{90(18\text{ hour})}$ free field between 6 am and 12 midnight > 45 dB(A)). 2. in accordance with chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013.

3.2 QUEENSLAND DEVELOPMENT CODE MP4.4

The Queensland Development Code MP4.4 document specifies external building construction requirements based on the external road traffic noise levels to achieve acceptable indoor noise levels. The road traffic noise level categories, as specified in Schedule 3 of MP4.4, are given in Table 3-2. The required building construction acoustic ratings for each noise category are also listed in Table 3-2.

Table 3-2: MP4.4 Road Traffic Noise Category Levels and Required Building Construction Acoustic Ratings

Free-field Noise Category	Level of Traffic Noise $L_{A10(18hr)}$ (façade corrected)	Required Acoustic Ratings (R_w)			
		Glazing and Frames		External Walls	Ceiling and Roofs
		Room Façade Glazing Area $\geq 1.8m^2$	Room Façade Glazing $< 1.8m^2$		
Category 4	≥ 73 dB(A)	R_w 43	R_w 43	R_w 52	R_w 45
Category 3	68-72 dB(A)	R_w 38	R_w 35	R_w 47	R_w 41
Category 2	63-67 dB(A)	R_w 35	R_w 32	R_w 41	R_w 38
Category 1	58-62 dB(A)	R_w 27	R_w 24	R_w 35	R_w 35
Category 0	≤ 57 dB(A)	None	None	None	None

3.3 ENVIRONMENTAL PROTECTION (NOISE) POLICY 2008

The acoustic quality objectives from the EPP (Noise) 2008 have been adopted to assess noise emissions from the nearby 7-Eleven Service Station Pimpama to the west of the site. The acoustic objectives are presented in Table 3-3.

Table 3-3: EPP 2008 Acoustic Quality Objectives

NSRs	Time of Day	Acoustic Quality Objectives, dB(A)		
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}
Dwelling (Outdoors)	Day and Evening (7am –10pm)	50	55	65
Dwelling (Indoors)	Day and Evening (7am –10pm)	35	40	45
Dwelling (Indoors)	Night (10pm – 7am)	30	35	40/ 45*

*The applicable noise limit at night is 45 dB(A) L_{A1,1hr(10pm to 7am)} at the external façade of a residence, assuming a conservative 5dB(A) noise reduction (i.e. assuming windows fully open).

4 EXISTING NOISE ENVIRONMENT

Unattended noise measurements were conducted at the development site between 21st March 2019 and 26th March 2019 using 2 environmental noise loggers. The noise loggers were used to record noise levels at 15 minute intervals with the microphone set up in free field at 1.5m above ground level. All monitors were calibrated before and after the measurements and no significant drift was noted (<0.5 dB). A list of the equipment used is presented in Table 4-1.

Table 4-1: Summary of Measurement Equipment

Instrument	Serial Number	Next Calibration Date
Larson Davis 831	2056	14 th February 2021
Larson Davis 831	2058	13 th March 2021

The environmental noise loggers were installed at Location 1 (Lot 1426) to the south-west of the site and Location 2 (Lot 1414) to the south-east of the site as shown in Figure 4-1. The day time environmental noise during the site visits was dominated by constant traffic on Yawalpah Road, the occasional car pass-bys on Gainsborough Drive and some bird and insect noises.

The measurements were conducted in general accordance with Australian Standard AS 1055:1997 – “Acoustics – Description and measurement of environmental noise”. Further information on the instrumentation, measurement details, measurement results and weather data for the monitoring period are presented in Appendix B. Weather conditions were fine during the noise monitoring.

Noise monitoring results from Location 1 and Location 2 are shown in Table 4-2.

Table 4-2: Measured Noise Levels

Monitoring Location	L _{A10} (18hr)	L ₉₀ (18hr)	L _{Aeq,1hr}
	dB(A)		
Location 1 (2058)	54.8	44.4	59.6
Location 2 (2056)	57.5	47.5	58.3

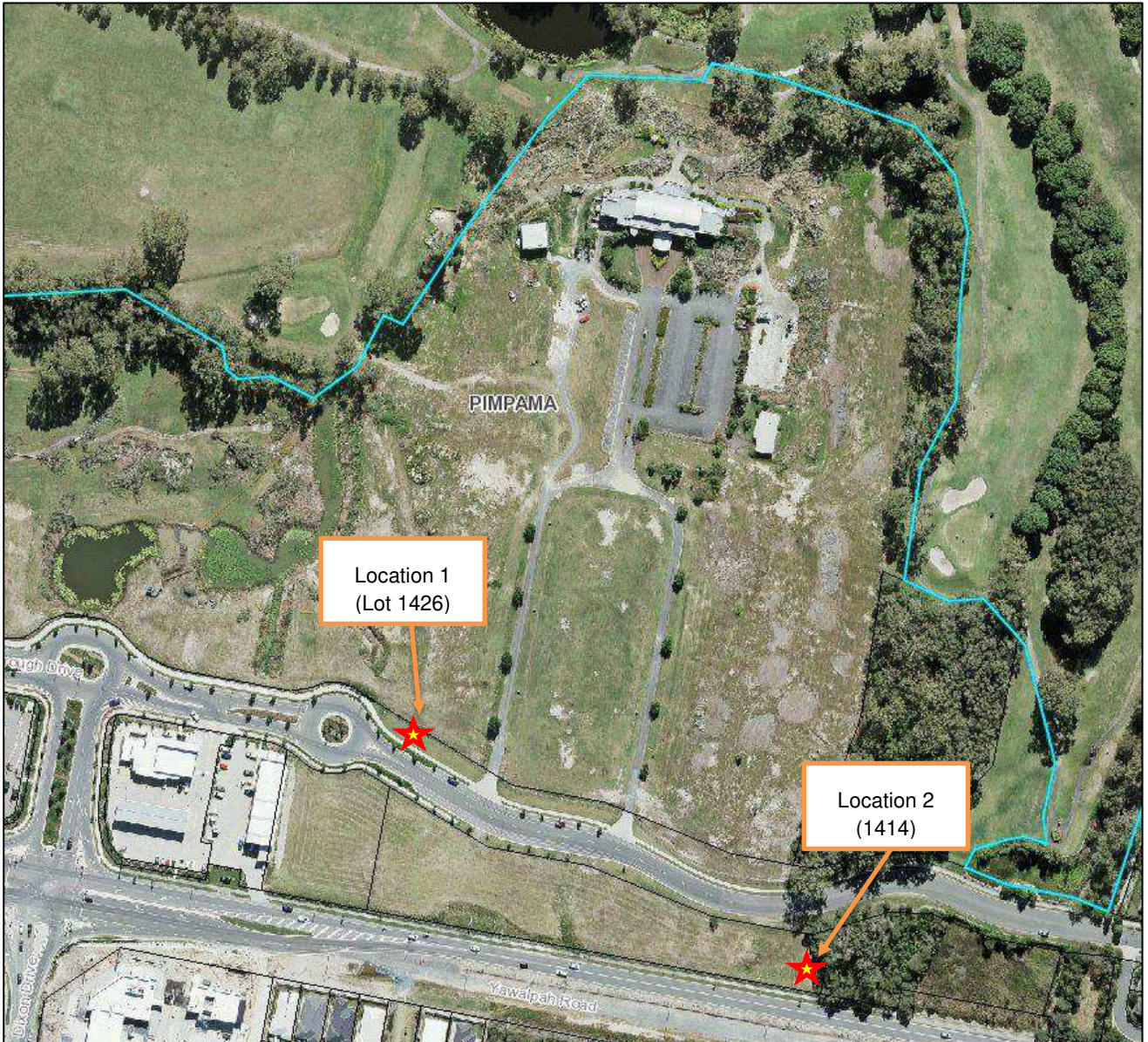


Figure 4-1: Noise Monitoring Locations

5 NOISE IMPACT ASSESSMENT

5.1 TRAFFIC NOISE MODELLING

A traffic noise impact assessment has been conducted using SoundPLAN noise modelling software. The following are discussed in this section:

- Modelling methodology and traffic data;
- Model calibration; and
- Predicted road traffic noise levels and MP4.4 Categories.

5.1.1 MODELLING METHODOLOGY AND TRAFFIC DATA

Traffic noise calculations were carried out using SoundPLAN 8.0 noise modelling software. The data and assumptions used in traffic noise modelling are presented in Table 5-1.

Table 5-1: Data and Assumptions Used in Traffic Noise Modelling

Parameter	Data
Future Residence Receiver Heights	Ground Floor: 1.8m above ground level as obtained from terrain data (façade corrected) Ground Floor: 1.5m above ground level as obtained from terrain data (outdoor spaces for passive recreation) First Floor: 4.6m above ground level as obtained from terrain data (assuming height of storeys as 2.8m)
Terrain Data	Data from Mirvac Group, "BR004595-003-285-1 P3-1 Park Current 5-3-2019-EXT.dwg", received 18/03/2019 Data from Mirvac Group, "BR004595-003-164-5 design tin_EXT.dwg", received 18/03/2019
Lot Layout	Data from Mirvac Group, "stamped approved plans - lot 805 sp291377, lot 805 gainsborough drive, Pimpama.pdf", received 21/02/2019
Road Surface	Dense Graded Asphalt was modelled as the road surface for all roads.
CoRTN Calibration Factors	-0.7 for free field*; and -1.7 at 1 m in front of building façade (i.e. façade corrected)*
Calculation Method	UK's Calculation of Road Traffic Noise (CoRTN)
Traffic Volume Conversions - AADT to 18 hour Traffic Flows	94% of AADT

* Transport Noise Management Code of Practice, Transport and Main Roads, November 2013

2015 Annual Average Daily Traffic (AADT) data was obtained from the Burchills Engineering Solutions Report, "Intersection Capacity Assessment – Gainsborough Greens Master Plan", dated 13th May 2015. AADT for 2019 and 2030 has been calculated based on an approximated 2% increase per annum. This annual increase has been applied to the base data to forecast the traffic volume for 2030 (10 years from the date of construction) as shown in Table 5-2.

Table 5-2: Traffic Volumes

Road	Scenario	Year	AADT	18hr Traffic Volumes	%CV*	Speed (km/h)
Caloundra Road	Validation	2015	29218	274465	2	70
	Ultimate	2030	36329	34150	2	70

*2019 and 2030 %CVs are assumed to be the same

5.1.2 TRAFFIC NOISE MODEL VALIDATION

The traffic noise model was validated by comparing model predicted traffic noise levels with measured noise levels. The results are shown in Table 5-3.

Table 5-3: Noise Model Validation Results

Location	Source	L _{A10, 18h} dB(A)	Difference dB(A)
Location 1 (2058)	Model Predicted	54.5	-0.3
	Measured	54.8	
Location 2 (2056)	Model Predicted	57.5	0
	Measured	57.5	

The difference between traffic noise levels predicted by the model and measured was 0.3dB(A) for Location 1 and 0dB(A) for Location 2. The difference between predicted and measured traffic noise levels at both locations is lower than the +/- 2dB(A) accuracy limit specified in the Transport Noise Management Code of Practice, Transport and Main Roads.

5.2 PREDICTED NOISE LEVELS

5.2.1 PREDICTED TRAFFIC NOISE LEVELS FOR OUTDOOR SPACES WITH EXISTING BARRIER

The predicted noise levels for the outdoor spaces are tabulated in Appendix C. Noise modelling results show future traffic noise levels for the lots in the development will range between L_{A10,18hr} 45 dB(A) and 60 dB(A). Consequently, all private open space traffic noise levels will comply with the noise criteria in Table 3-1. Noise contour maps are presented in Appendix E.

5.2.2 PREDICTED FAÇADE CORRECTED TRAFFIC NOISE LEVELS WITH EXISTING BARRIER

The lots in the proposed development fall into MP4.4 Traffic Noise Categories 0 to 2 for the ground floor and 0 to 3 for the first floor. The predicted results for are tabulated in Table 5-4 and Appendix D. Noise contour maps are presented in Appendix E.

Table 5-4: Predicted Facade Corrected Traffic Noise Levels at Lots

MP4.4 Noise Category	Lots	
	Ground	First
0	1428-1524	1428, 1433-1524
1	1415-1427	1415-1427, 1429-1432
2	1401-1414	-
3	-	1401-1414

5.3 BUILDING CONSTRUCTION ACOUSTIC REQUIREMENTS

Building construction should be designed to achieve the ratings specified in the MP4.4 document, as presented in Table 3-2. Glazing, external wall, ceiling/roof and ventilation requirements are specified in Sections 5.3.1 to 5.3.4.

5.3.1 GLAZING REQUIREMENTS

Glazing requirements were determined to achieve acceptable indoor road traffic noise levels, as per MP4.4. Glazing requirements are specified in Table 5-5.

Table 5-5: Required Glazing Ratings for Future Residences

Floor	Lots	Minimum Required Glazing and Frames Acoustic Rating (R_w)	
		Room Façade Glazing Area \geq 1.8m ²	Room Façade Glazing Area <1.8m ²
Ground	1415-1427	27	24
	1401-1414	35	32
First	1415-1427, 1429-1432	27	24
	1401-1414	38	35

Typical R_w values for different glazing thicknesses are presented in Table 5-6.

Table 5-6: Typical R_w Values for Different Glazing Thicknesses

R_w	Glazing Thickness
20	3 mm
25	4.5/5 mm
31	6.38/6.76mm laminate
35	10.38 mm laminate
40	Double glazed (>75mm cavity)

It is required that the R_w performance ratings of the glazing systems (windows and frames) be certified by the supplier prior to installation. Glazing and frame certificates will be required for building certification. Where glazing system requirements are considered high, the design or glazed surface area can be reduced to minimise the acoustic rating required.

5.3.2 EXTERNAL WALL REQUIREMENTS

The external wall construction options shown in Table 5-7 are example forms of construction to achieve acceptable indoor traffic noise levels. Alternative external wall constructions that achieve the specified acoustic ratings may be adopted.

Table 5-7: Required External Wall Construction Specifications for Future Residences

Floor	Required Acoustic Rating (R _w)	Lots	Construction options to achieve the required rating	
Ground	35	1415-1427	External Wall – Brick	Single leaf of brick masonry (minimum 110mm)
				70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
	41	1401-1414	External Wall – Lightweight	Fibre cement cladding (minimum 6.5mm)
				70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
First	35	1415-1427, 1429-1432	External Wall – Brick	Brick veneer (minimum 70mm)
				70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
	47	1401-1414	External Wall – Lightweight	Fibre cement cladding (minimum 6.5mm)
				70mm timber studs at 600 mm centres
				1 X 10mm acoustic rated plasterboard
First	35	1415-1427, 1429-1432	External Wall – Brick	Single leaf of brick masonry (minimum 110mm)
				70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
	47	1401-1414	External Wall – Lightweight	Fibre cement cladding (minimum 6.5mm)
				70mm timber studs at 600 mm centres
				1 X 10mm plasterboard
47	1401-1414	External Wall – Brick	Brick veneer (minimum 70mm)	
			70mm timber studs at 600 mm centres	
			1 X 10mm plasterboard	
				R2.5 Batts insulation

5.3.3 CEILING/ROOF REQUIREMENTS

The ceiling/roof construction specifications Table 5-8 are example forms of construction to achieve acceptable indoor traffic noise levels. Alternative ceiling/roof constructions that achieve the specified acoustic rating may be adopted.

Table 5-8: Required Ceiling / Roof Construction Specifications for Future Residences

Floor	Lots	Required Acoustic Rating (R _w)	Construction to achieve the required rating
First	1401-1414	41	Concrete tiles / sheet metal
			R3.0 Batts insulation
			10mm acoustic rated plasterboard

5.3.4 VENTILATION REQUIREMENTS

Acceptable indoor noise levels according to MP4.4 can be achieved: however, for the habitable rooms of future residences on Lots where the MP4.4 traffic noise categories are 1 or greater, doors and windows must be closed. Alternative ventilation may include air-conditioning, borrowed ventilation, mechanical assisted ventilation or other suitable methods.

6 NOISE IMPACTS FROM SERVICE STATION

A service station is located adjacent to the proposed development and operates 24/7. At the subject site, traffic noise from Yawalpah Road is the dominant noise source.

The main noise concern from the service station and mechanical workshop is short term intermittent noise from the operation of the service station during the night time period which includes engine noise, car door slam and vehicles moving forward and backward. The typical noise levels from these events at 1 m away are presented in Table 6-1.

Table 6-1: Typical Noise Levels from Vehicles

Noise Source	Noise Levels at 1 m L _{A1} dB(A)	Sound Power Levels L _{A1} dB(A)
Car door slam	77	85
Engine Noise	72	80
Vehicle movements	69	77

The closest distance from the proposed development to the canopy of the service station is approximately 60 m. At this distance, the L_{A1} noise levels are predicted to range between 34 and 42 dB(A). The applicable noise limit at night is 45 dB(A) L_{A1,1hr(10am to 7am)} at the external façade of a residence, assuming a 5dB(A) noise reduction (i.e. assuming windows fully open).

The resulting predicted noise levels are less than the L_{A1} 45 dB(A) at the external façade of the nearest residence, and therefore comply with the criteria specified in Table 3-3 for the EPP (Noise) 2008 acoustic quality objectives. Consequently, no additional noise amelioration would be required for the service station.

7 CONCLUSION AND RECOMMENDATIONS

Vipac Engineers & Scientists Ltd (Vipac) has completed a noise impact assessment for Precinct 3.1 of the proposed Gainsborough Greens residential development located on Gainsborough Drive, Pimpama (Lot 805 on SP291377).

Traffic noise levels have been predicted to comply with the State Development Assessment Noise Provisions (SDAP) State Code 1 noise limits for all lots within the proposed development.

Noise impacts from the service station have been predicted to comply with the EPP (Noise) 2008 acoustic quality objectives at the nearest residences provided the building construction requirements recommended in Sections 5.3.1 to 5.3.4 are implemented.

The traffic noise QDC MP4.4 categories range from 0 to 2 for the ground floor lots and 0 to 3 for the first floor lots. As a result, the building construction requirements to achieve compliance are as follows:

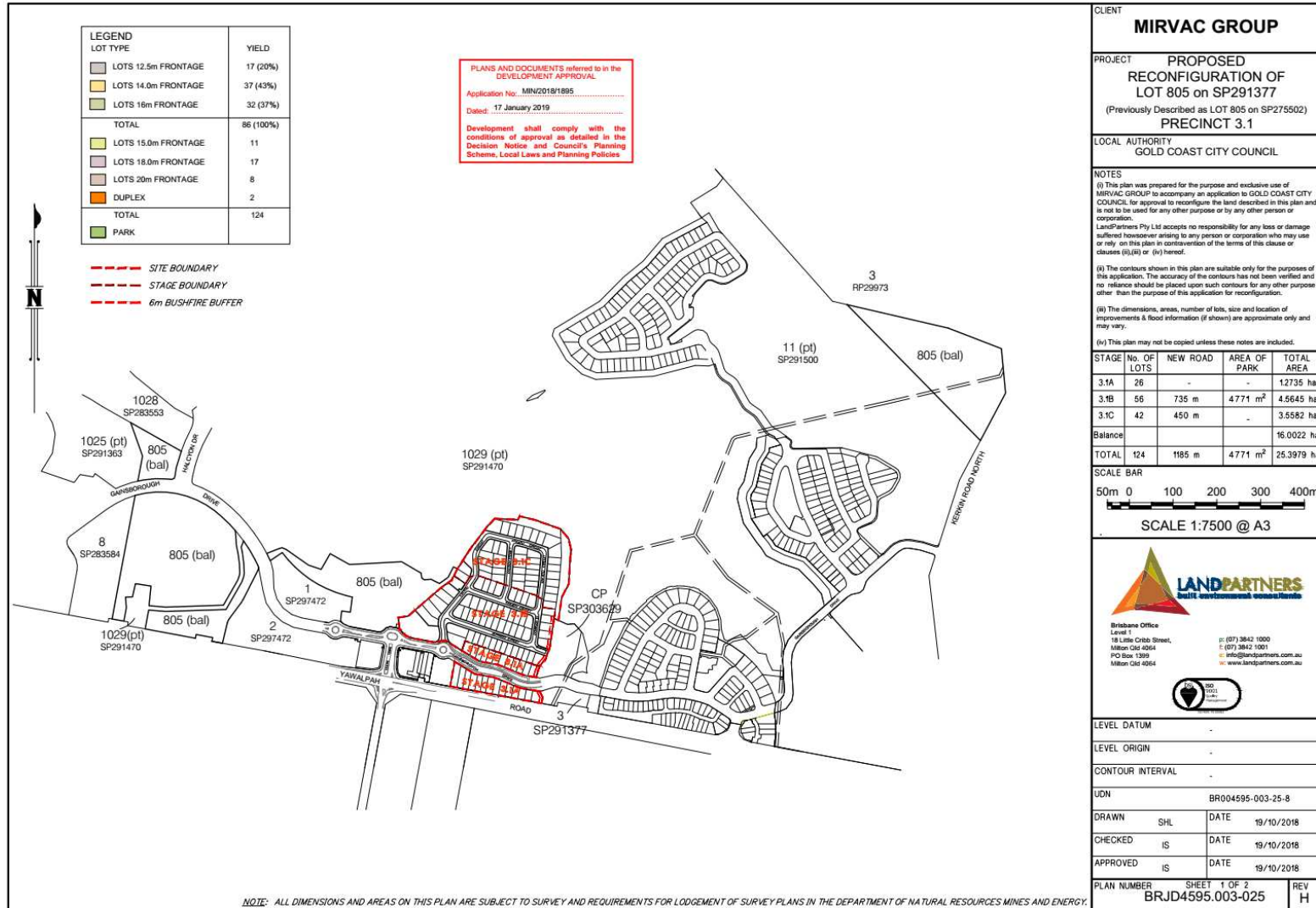
- Selection of glazing as presented in Table 5-5;
- Construction of external walls as presented in Table 5-7; and
- Construction of ceilings and roofs as presented in Table 5-8.

For habitable rooms of future residences on Lots where the MP4.4 Rail Noise Category is 1 or greater, doors and windows must be closed to achieve acceptable indoor noise levels. Under these conditions, alternative ventilation will be required in affected rooms. Alternative ventilation may include air-conditioning, borrowed ventilation, mechanically assisted ventilation or other suitable methods.

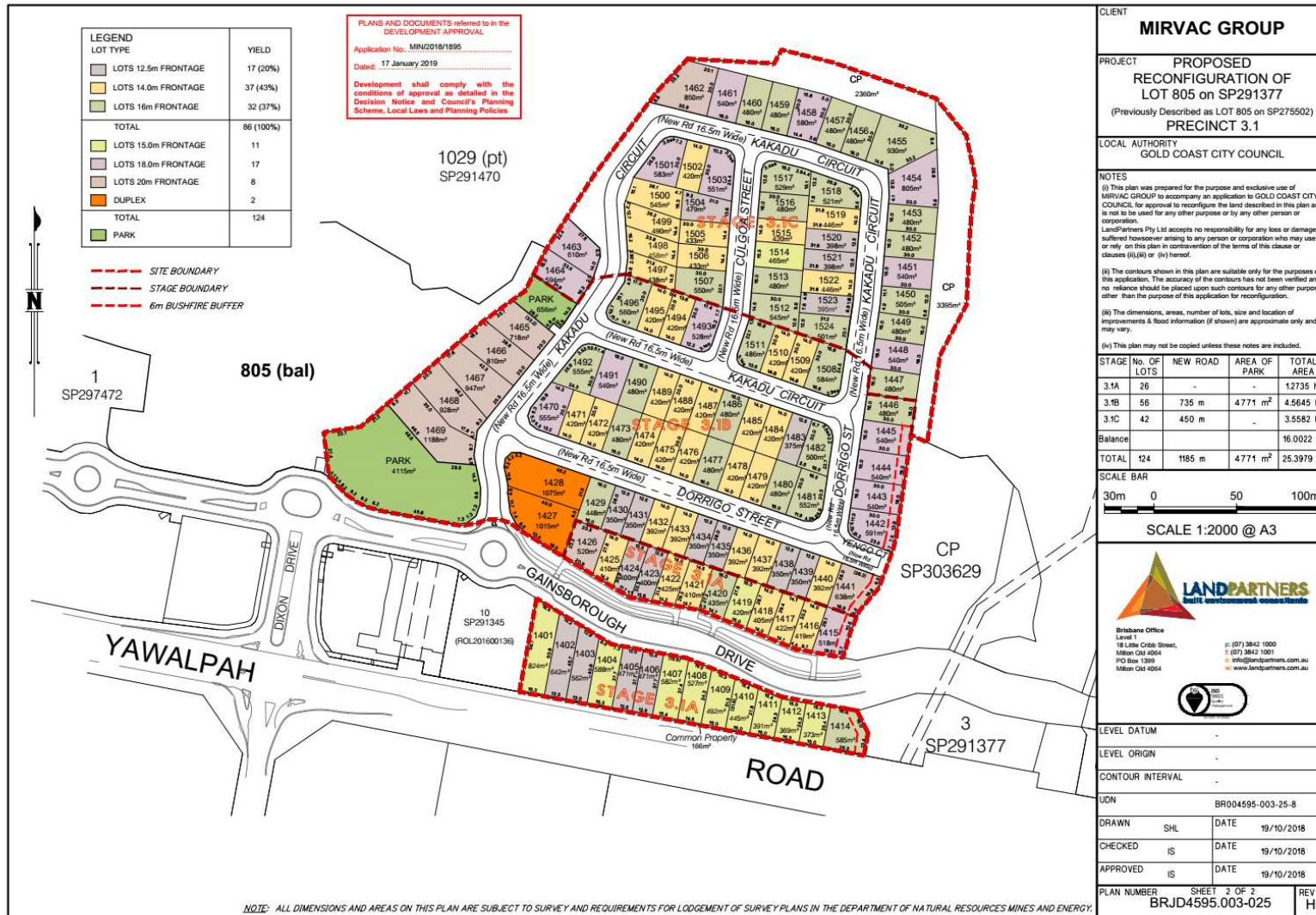


Appendix A SITE LAYOUT

This page has been left blank.



24 April 2019



24 April 2019

Appendix B NOISE MEASUREMENT RESULTS AND WEATHER OBSERVATIONS

Table B-1 Instrumentation

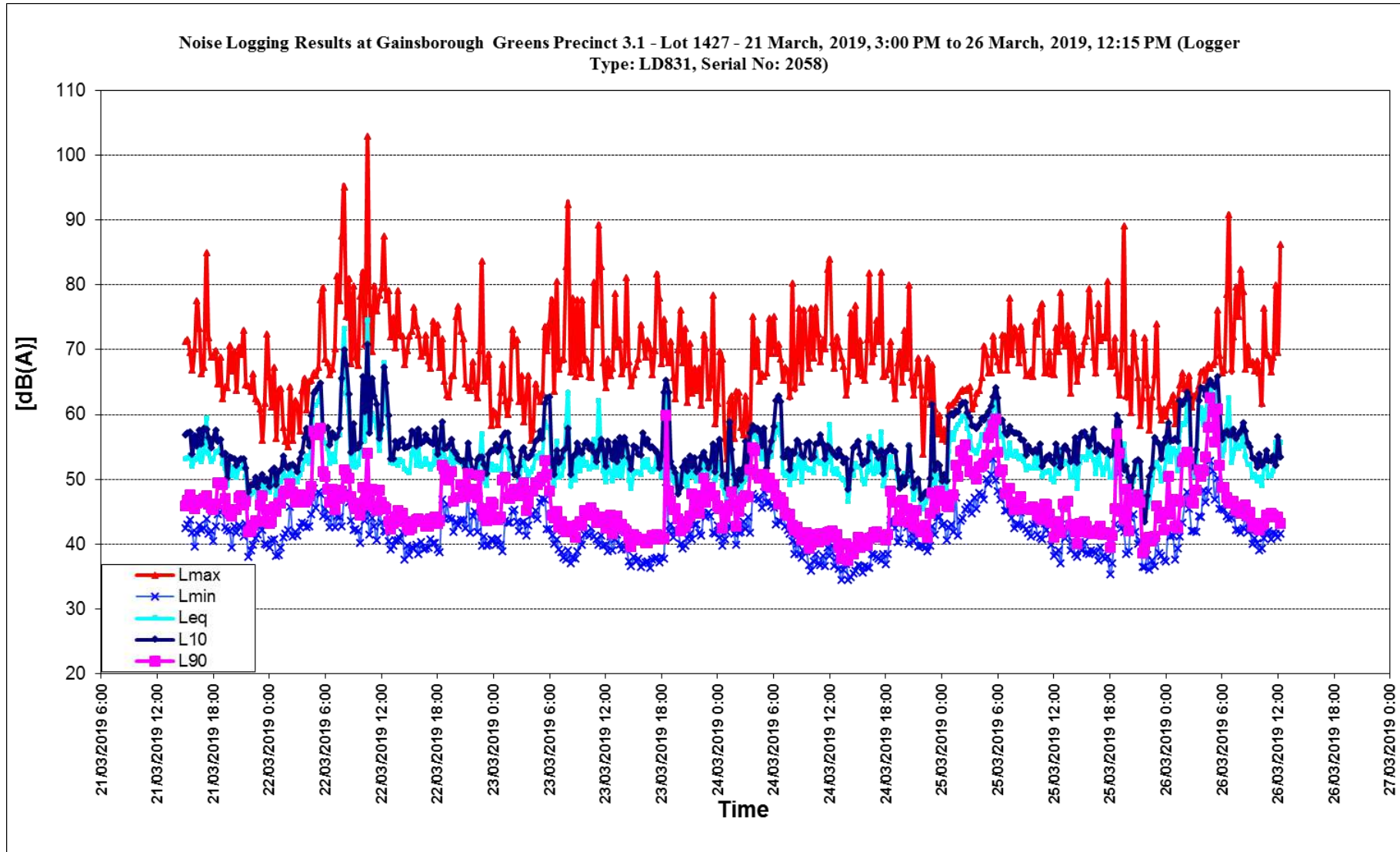
Instrument	Serial Number
Larson Davis LD-831 Noise logger	2058
Larson Davis LD-831 Noise logger	2056
Ono Sokki SC-2120 Sound Calibrator	35100928

Table B-2 Noise Monitoring Details

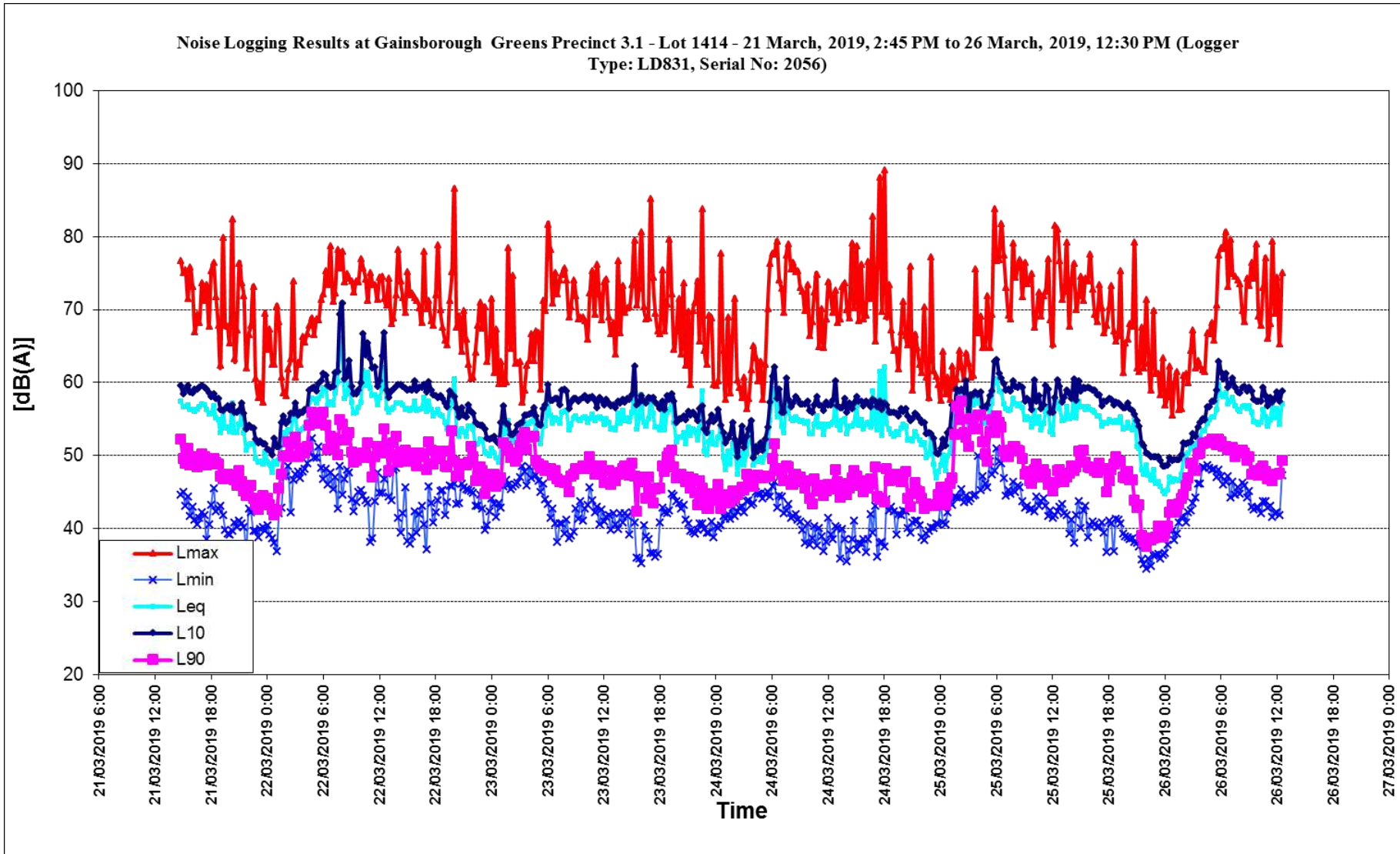
Parameter	Location 1 (2058)	Location 2 (2056)
Microphone Height	1.5m	
Microphone Orientation	Pointing vertically upwards	
SLM Time Weighting	Fast	
SLM Frequency Weighting	A	
Measurement Interval Period	15 min intervals	
Logger location	Lot 1427	Lot 1414
Measurement weather	Fine, light breeze.	
Date of measurement	Between the	
Observations		

Table B-3 Noise Monitoring Results (Free Field)

Noise Descriptor	Location 1 (2058)	Location 2 (2056)
	Noise Level (dB(A))	
Average L _{A10} , 18hr (6am to 12am)	54.8	57.5
Average L _{A90} , 8hr (10pm to 6am)	48.4	47.5
L _{Amax} (24hr)	92.1	86.2
L _{Amax,Night} (10pm to 7am)	80.9	81.7
Average L _{Aeq,Avg Day} (7am to 6pm)	55.4	56.3
Average L _{Aeq,Avg Evening} (6pm to 10pm)	52.8	54.6
Average L _{Aeq,Avg Night} (10pm to 7am)	55.4	53.9
Average L _{Aeq,Max 1hr Day} (7am to 6pm)	58.9	58.2
Average L _{Aeq,Max 1hr Evening} (6pm to 10pm)	55.0	56.0
Average L _{Aeq,Max 1hr Night} (10pm to 7am)	59.6	57.7
Average L _{A90} (7am to 6pm)	43.3	48.0
Average L _{A90} (6pm to 10pm)	46.0	47.2
Average L _{A90} (10pm to 7am)	48.4	47.9
RBL Day	41.4	46.6
RBL Evening	43.8	46.2
RBL Night	44.7	43.6
Average L _{A90,18hr} (6am to 12am)	44.4	47.5



24 April 2019



24 April 2019

Appendix C PREDICTED TRAFFIC NOISE LEVELS FOR OUTDOOR SPACES

Table C-1: Predicted Free-field Traffic Noise Levels for Private Open Spaces

Lot No	Noise Level
	LA10,18hr (dB(A))
1401	60
1402	59
1403	60
1404	60
1405	60
1406	60
1407	60
1408	60
1409	60
1410	59
1411	60
1412	59
1413	60
1414	60
1415	55
1416	55
1417	55
1418	55
1419	55
1420	55
1421	55
1422	55
1423	55
1424	55
1425	55
1426	55
1427	54
1428	54
1429	54
1430	54
1431	54
1432	54
1433	54
1434	54
1435	54
1436	53
1437	53
1438	53



Lot No	Noise Level
	LA10,18hr (dB(A))
1439	53
1440	53
1441	53
1442	51
1443	50
1444	50
1445	49
1446	48
1447	48
1448	47
1449	47
1450	47
1451	46
1452	46
1453	45
1454	45
1455	45
1456	45
1457	45
1458	45
1459	45
1460	45
1461	45
1462	45
1463	48
1464	48
1465	50
1466	51
1467	51
1468	52
1469	54
1470	52
1471	52
1472	52
1473	52
1474	52
1475	52
1476	52
1477	52
1478	52
1479	51



Lot No	Noise Level
	LA10,18hr (dB(A))
1480	51
1481	51
1482	50
1483	50
1484	51
1485	51
1486	51
1487	51
1488	51
1489	51
1490	50
1491	50
1492	50
1493	49
1494	49
1495	49
1496	49
1497	48
1498	48
1499	47
1500	47
1501	47
1502	47
1503	46
1504	47
1505	47
1506	48
1507	48
1508	48
1509	49
1510	49
1511	49
1512	48
1513	48
1514	47
1515	47
1516	46
1517	46
1518	45
1519	46
1520	46



Lot No	Noise Level
	LA10,18hr (dB(A))
1521	46
1522	47
1523	47
1524	47

Appendix D PREDICTED TRAFFIC NOISE LEVELS AND MP4.4 CATEGORIES

Table D-7-1: Predicted Façade Corrected Traffic Noise Levels and Construction Categories

Lot No	Floor	Noise Level	QDC MP4.4 Categories
		LA10,18hr Façade Corrected	
1401	Ground	64	2
	First	70	3
1402	Ground	65	2
	First	70	3
1403	Ground	64	2
	First	70	3
1404	Ground	64	2
	First	70	3
1405	Ground	63	2
	First	70	3
1406	Ground	63	2
	First	70	3
1407	Ground	63	2
	First	70	3
1408	Ground	63	2
	First	70	3
1409	Ground	63	2
	First	70	3
1410	Ground	63	2
	First	70	3
1411	Ground	64	2
	First	70	3
1412	Ground	63	2
	First	70	3
1413	Ground	63	2
	First	69	3
1414	Ground	64	2
	First	69	3
1415	Ground	58	1
	First	59	1
1416	Ground	58	1
	First	60	1
1417	Ground	58	1
	First	60	1
1418	Ground	58	1
	First	59	1
1419	Ground	58	1
	First	59	1



Lot No	Floor	Noise Level	QDC MP4.4 Categories
		LA10,18hr Façade Corrected	
1420	Ground	58	1
	First	59	1
1421	Ground	58	1
	First	59	1
1422	Ground	58	1
	First	59	1
1423	Ground	58	1
	First	59	1
1424	Ground	58	1
	First	59	1
1425	Ground	58	1
	First	59	1
1426	Ground	58	1
	First	59	1
1427	Ground	58	1
	First	58	1
1428	Ground	56	0
	First	57	0
1429	Ground	56	0
	First	58	1
1430	Ground	56	0
	First	58	1
1431	Ground	57	0
	First	58	1
1432	Ground	57	0
	First	58	1
1433	Ground	56	0
	First	57	0
1434	Ground	56	0
	First	57	0
1435	Ground	56	0
	First	57	0
1436	Ground	56	0
	First	57	0
1437	Ground	55	0
	First	57	0
1438	Ground	55	0
	First	57	0
1439	Ground	56	0
	First	57	0
1440	Ground	56	0



Lot No	Floor	Noise Level	QDC MP4.4 Categories
		LA10,18hr Façade Corrected	
	First	57	0
1441	Ground	56	0
	First	57	0
1442	Ground	53	0
	First	55	0
1443	Ground	52	0
	First	54	0
1444	Ground	52	0
	First	53	0
1445	Ground	51	0
	First	53	0
1446	Ground	51	0
	First	52	0
1447	Ground	50	0
	First	52	0
1448	Ground	50	0
	First	51	0
1449	Ground	49	0
	First	51	0
1450	Ground	49	0
	First	50	0
1451	Ground	48	0
	First	50	0
1452	Ground	48	0
	First	49	0
1453	Ground	48	0
	First	49	0
1454	Ground	47	0
	First	49	0
1455	Ground	47	0
	First	48	0
1456	Ground	47	0
	First	48	0
1457	Ground	47	0
	First	48	0
1458	Ground	47	0
	First	48	0
1459	Ground	47	0
	First	48	0
1460	Ground	47	0
	First	49	0



Lot No	Floor	Noise Level	QDC MP4.4 Categories
		LA10,18hr Façade Corrected	
1461	Ground	47	0
	First	49	0
1462	Ground	48	0
	First	49	0
1463	Ground	50	0
	First	51	0
1464	Ground	51	0
	First	52	0
1465	Ground	52	0
	First	53	0
1466	Ground	53	0
	First	54	0
1467	Ground	54	0
	First	55	0
1468	Ground	55	0
	First	56	0
1469	Ground	56	0
	First	57	0
1470	Ground	54	0
	First	55	0
1471	Ground	54	0
	First	55	0
1472	Ground	54	0
	First	55	0
1473	Ground	54	0
	First	55	0
1474	Ground	54	0
	First	55	0
1475	Ground	54	0
	First	55	0
1476	Ground	54	0
	First	55	0
1477	Ground	54	0
	First	55	0
1478	Ground	54	0
	First	55	0
1479	Ground	54	0
	First	55	0
1480	Ground	53	0
	First	55	0
1481	Ground	53	0



Lot No	Floor	Noise Level	QDC MP4.4 Categories
		LA10,18hr Façade Corrected	
	First	55	0
1482	Ground	52	0
	First	54	0
1483	Ground	53	0
	First	54	0
1484	Ground	53	0
	First	54	0
1485	Ground	53	0
	First	54	0
1486	Ground	53	0
	First	54	0
1487	Ground	53	0
	First	54	0
1488	Ground	53	0
	First	54	0
1489	Ground	53	0
	First	54	0
1490	Ground	53	0
	First	54	0
1491	Ground	52	0
	First	54	0
1492	Ground	53	0
	First	54	0
1493	Ground	52	0
	First	53	0
1494	Ground	51	0
	First	53	0
1495	Ground	51	0
	First	52	0
1496	Ground	51	0
	First	52	0
1497	Ground	50	0
	First	51	0
1498	Ground	50	0
	First	51	0
1499	Ground	50	0
	First	51	0
1500	Ground	49	0
	First	50	0
1501	Ground	49	0
	First	50	0



Lot No	Floor	Noise Level	QDC MP4.4 Categories
		LA10,18hr Façade Corrected	
1502	Ground	49	0
	First	50	0
1503	Ground	49	0
	First	50	0
1504	Ground	49	0
	First	51	0
1505	Ground	50	0
	First	51	0
1506	Ground	50	0
	First	51	0
1507	Ground	51	0
	First	52	0
1508	Ground	51	0
	First	52	0
1509	Ground	51	0
	First	52	0
1510	Ground	51	0
	First	53	0
1511	Ground	52	0
	First	53	0
1512	Ground	50	0
	First	52	0
1513	Ground	50	0
	First	51	0
1514	Ground	50	0
	First	51	0
1515	Ground	49	0
	First	50	0
1516	Ground	49	0
	First	50	0
1517	Ground	48	0
	First	49	0
1518	Ground	48	0
	First	49	0
1519	Ground	48	0
	First	49	0
1520	Ground	48	0
	First	50	0
1521	Ground	49	0
	First	50	0
1522	Ground	49	0



Lot No	Floor	Noise Level		QDC MP4.4 Categories
		LA10,18hr	Façade Corrected	
	First	50	0	
1523	Ground	49	0	
	First	51	0	
1524	Ground	50	0	
	First	51	0	



Appendix E NOISE CONTOUR MAPS

This page has been left blank.

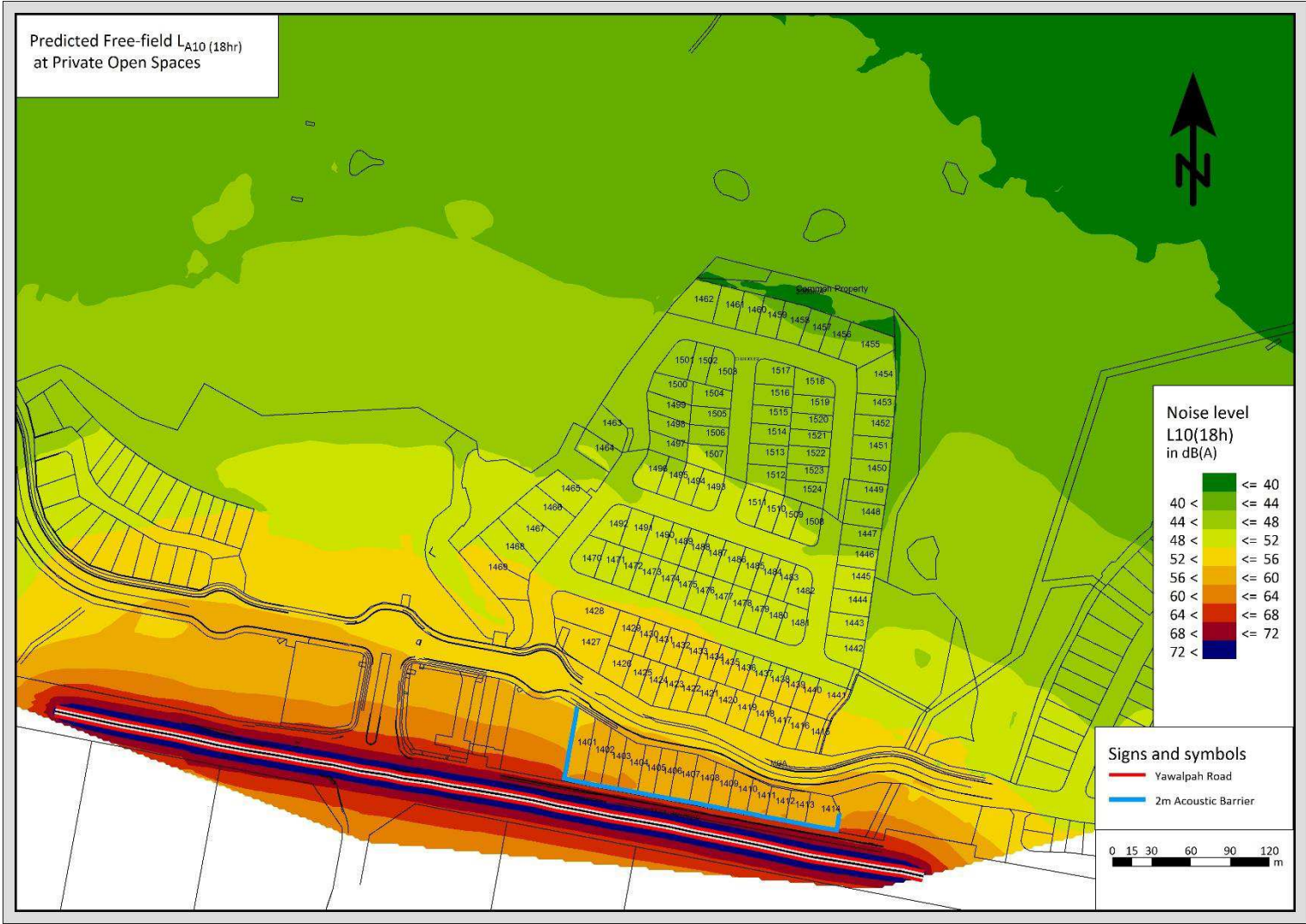


Figure E-1: Predicted Free Field LA10 (18hr) Road Traffic Noise Levels at Private Open Spaces of Lots

24 April 2019



Figure E-2: Predicted Façade Adjusted LA10 (18hr) Road Traffic Noise Levels at the Ground Floor of Lots

24 April 2019

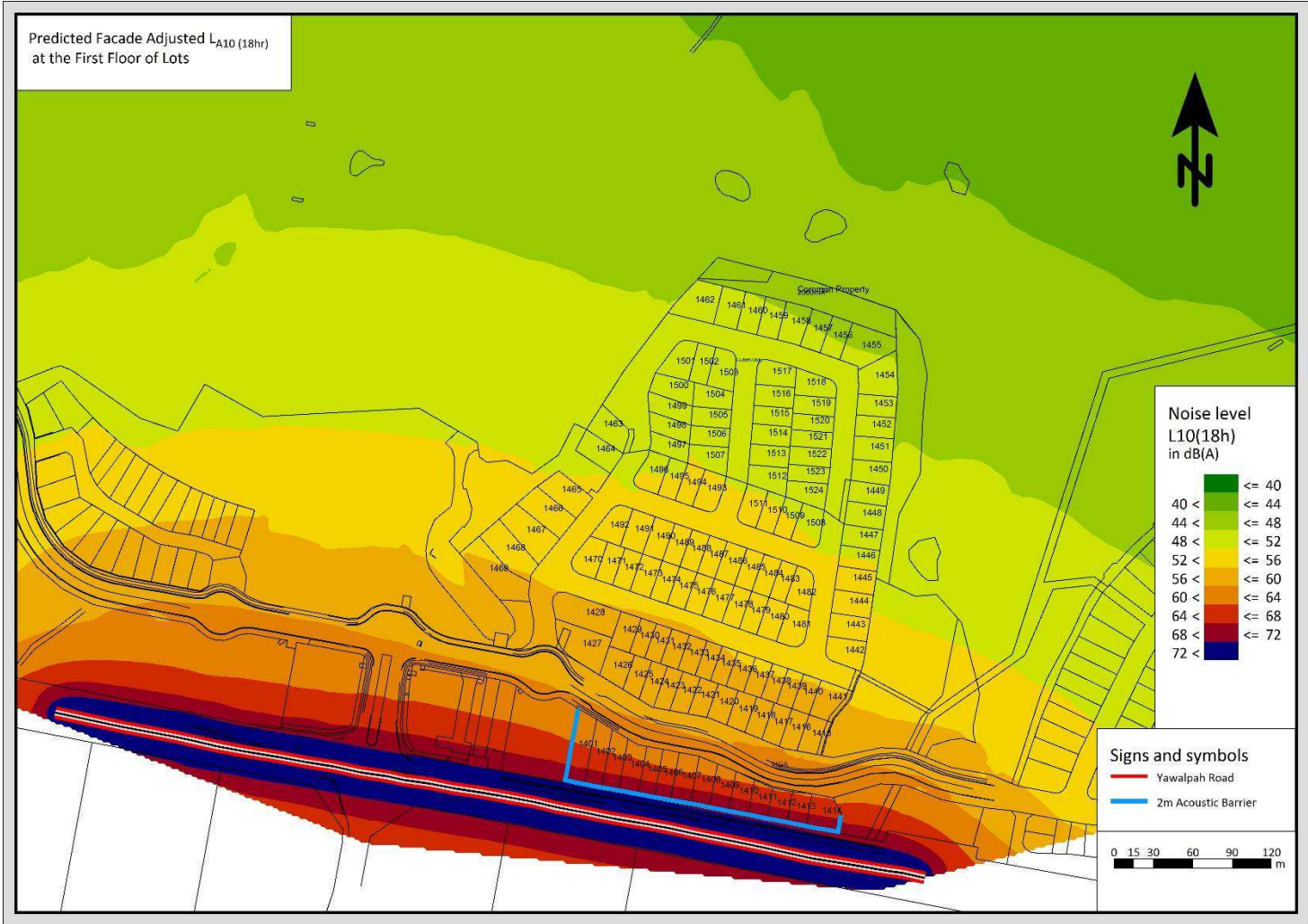


Figure E-3: Predicted Façade Adjusted LA_{10} (18hr) Road Traffic Noise Levels at the First Floor of Lots