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TRAFFIC NOISE ASSESSMENT

Proposed New Development Tall Oak Drive Cotswold QLD

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DOCUMENT CONTROL

Revision	Issue Date	Item	Author	Review
0	16/04/2025	Noise Impact Assessment	RF	MF
1	14/05/2025	Include STP reverse amenity	MF	MF
2	25/05/2025	Include EPA Act Pump Criteria	MF	MF
3	04/07/2025	Adjust Acoustic Barrier Location	MF	MF
4	14/07/2025	Describe internal barrier	MF	MF
5	17/11/2025	RFI barrier colours clarified	MF	MF
6	12/03/2026	Acoustic Fence Adjustment and remodel	RF	MF

CLIENT

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CONTENTS

EXECUTIVE SUMMARY

Alpha Acoustics has been engaged by Gemstone Lifestyle to carry out a road traffic noise assessment a proposed 207 residential lot subdivision at Proposed New Development Tall Oak Drive Cotswold QLD 4350. This report is an addition to the existing report by Range Environmental Ref J002130 dated 8th November 2024.

This report determines the required height and extent of the boundary traffic noise barrier to meet the minimum requirements of state controlled roads outdoor areas. Additionally the Sewerage Treatment Plant noise emissions are assessed as part of a reverse amenity criteria. Other acoustic maters are delt with in the Range Environmental acoustic report.

Toowoomba Bypass is adjacent to the proposed subdivision to the north of the site. Due to the sites' proximity to Toowoomba Bypass and the number of lot divisions (207 lots), the proposed development has been assessed against acoustic issues contained within:

- State Development Assessment Provisions (SDAP) Version 3.0

This road traffic noise assessment was undertaken in accordance with the Transport Noise Management Code of Practice Volume 1 - Road Traffic Noise (2013) (hereafter 'RTN Code') to address SDAP State Code 1 Development in a State Controlled Road Environment (version 3).

The following conclusions apply to this assessment:

- The road traffic noise assessment including predicted 2035 traffic noise levels across the site were assessed against the SDAP traffic noise criteria.
- Traffic noise modelling demonstrates all proposed lots satisfy the SDAP Outdoor traffic noise criteria **given an acoustic barrier construction and location is outlined in section 4.4 of this report.**
- A reverse amenity assessment of the existing Sewerage Treatment Plant has been carried out and an **acoustic barrier construction and location is outlined in section 4.4 of this report.**

1 INTRODUCTION AND SITE DESCRIPTION

Alpha Acoustics has been engaged by Gemstone Lifestyle to carry out an SDAP based acoustic assessment for a proposed new lot development at Tall Oak Drive Cotswold QLD 4350, and to determine appropriate acoustic solusions for the development to meet SDAP criteria for the boundary barrier. Additionally a nearby Sewerage Treatment Plant (STP) is assessed to a reverse amenity criteria. The plan consists of a proposed 205 lot residential subdivision and is adjacent to the Toowoomba Bypass (see Figure 1.1 and Figure 1.2 below).

Figure 1.1 Location Map of Site and Measurement Location (SPP Mapping)

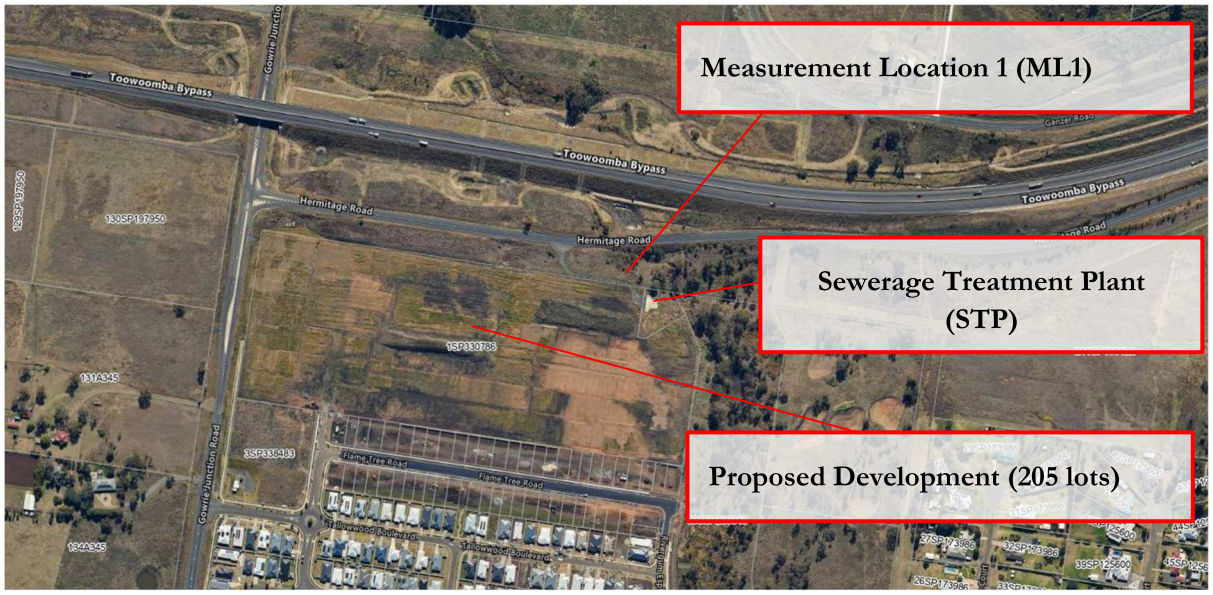
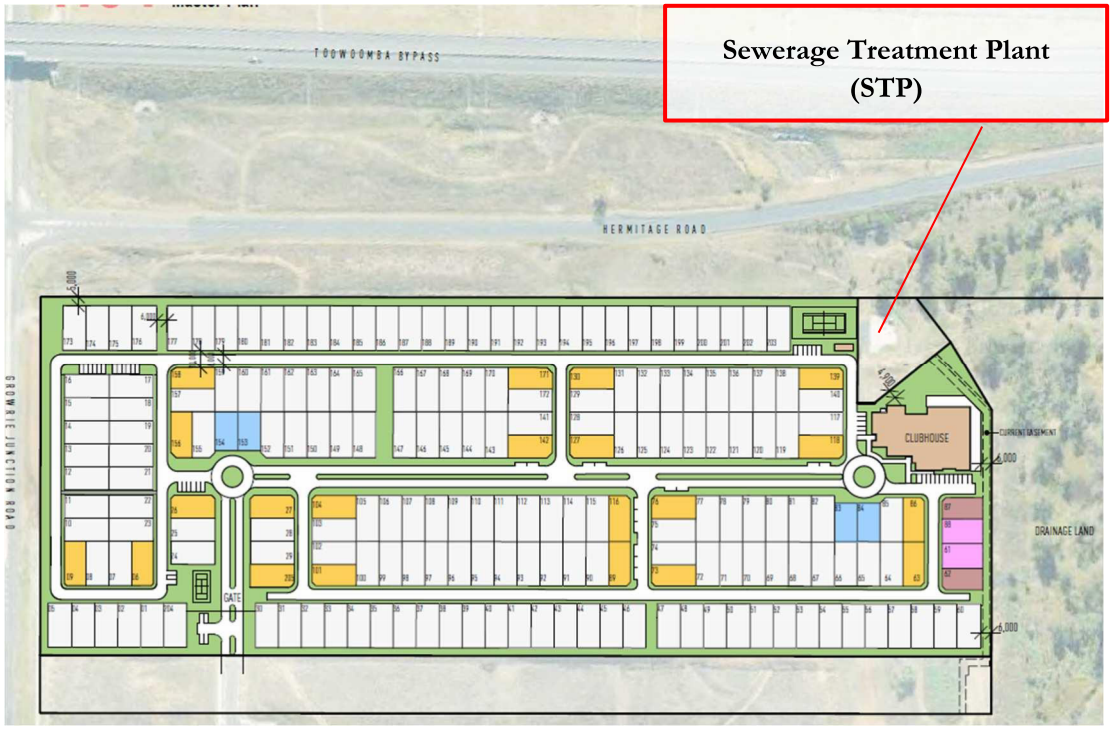


Figure 1.2 Preposed 205 Lot Residential Subdivision (Appendix A Development Plans)



2 NOISE SURVEY AND INSTRUMENTATION

An on-site survey was conducted between 13th March 2025 and 20th March 2025 (weekdays only used). The measurement location (ML1) was located on the new development at Tall Oak Drive Cotswold QLD 4350 at 1.5 m above surface level as seen in Figure 2.1 below and is considered free field.

All instrumentation used in this assessment holds a current calibration certificate from a certified NATA calibration laboratory. Table 2.1 shows the instruments were used to measure the ambient noise levels.

Table 2.1 Noise Instrumentation

Description	Model No.	Serial No.
Larsen Davis Noise Meter	831	0001156
Condenser Microphone 0.5" diameter	UC-52	133664
Acoustical Calibrator	Larsen Davis	CAL200
Microphone Windscreen	Acoustically transparent foam	

Ambient sound pressure levels were measured generally in accordance with Australian Standard AS1055.1:1997 - 'Acoustics-Description and measurement of environmental noise - Part 1:

Overall weather conditions during the measurement period were suitable for noise monitoring and days that do not comply with the maximum acceptable values outlined in the RTN Code - average wind speed up to 3 m/s and rainfall of up to 0.3 mm/hr were removed as per requirements of the code.

Meteorological data was collected onsite and shown in Appendix D - Meteorological data

Figure 2.1 Exterior Noise Levels at ML1 (free field)

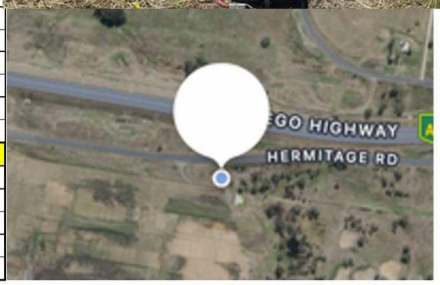
Results from Measured Traffic Noise Levels

Road Traffic Noise Levels Measured 25 Tall Oak Drive, Cotswold Hills

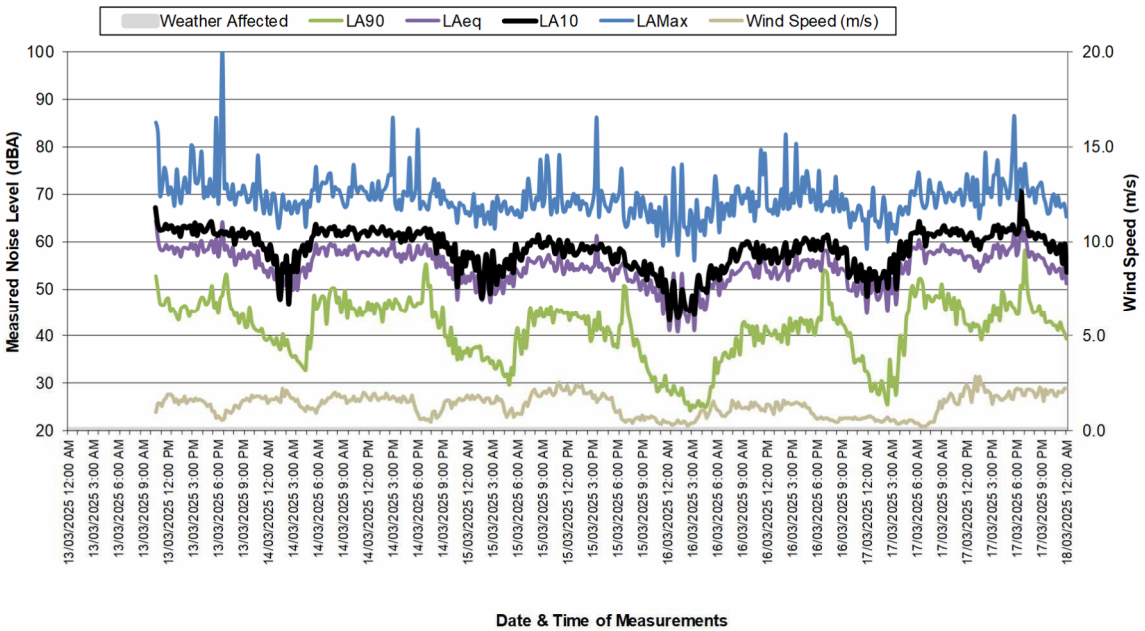
Measured Average LA10 1 hour Road Traffic Noise Levels

Time Period	L90	Leq	Measured $L_{A10\ 1hr}$ Noise Level dB(A)
00:00-01:00	35	50	54
01:00-02:00	34	51	53
02:00-03:00	33	51	53
03:00-04:00	34	54	55
04:00-05:00	36	54	57
05:00-06:00	43	57	60
06:00-07:00	45	57	60
07:00-08:00	47	57	61
08:00-09:00	47	58	61
09:00-10:00	47	58	62
10:00-11:00	47	58	62
11:00-12:00	46	58	62
12:00-13:00	45	57	61
13:00-14:00	45	58	61
14:00-15:00	45	58	61
15:00-16:00	46	58	62
16:00-17:00	46	58	62
17:00-18:00	45	58	61
18:00-19:00	50	59	62
19:00-20:00	46	56	61
20:00-21:00	42	56	60
21:00-22:00	41	55	59
22:00-23:00	37	54	57
23:00-00:00	36	51	55
L10,18hr			**60.5**
L10,1hr, Max			**62**
L10,12hr, 6am to 6pm			**61**
Leq 1hr, Max		**59**	
L90, 8hr, 10pm to 6am	**45**		
L90, 18hr, 6am to 12 midnight	**36**		

Photograph of Noise logger location



Road Traffic Noise Levels Measured 25 Tall Oak Drive, Cotswold Hills (Between - 13/03/2025 & 18/03/2025)



The observed survey revealed that the noise environment was dominated by emissions from the subject road traffic.

3 CRITERIA

3.1 Traffic Noise State Development Assessment Provisions (SDAP)

As the development involves 6 or more new residential lots (205 lots in total), the noise criteria outlined in this section applies to this development.

The criteria applied is the SDAP Version 3.2 by the Department of State Development, Manufacturing, Infrastructure and Planning. The SDAP State Code 1: Development in a state-controlled road environment sets out matters of interest for the assessment of developments near a state-controlled road or type 1 multi-modal corridor. The applicable criteria for the development requires traffic noise to be assessed in accordance with Table 3.1.1 and 3.1.2 as follows (Table 1.5 and Table 2 of SDAP);

Table 3.1.1 (Table 1.5 of SDAP) Environmental emissions

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

Table 3.1.2 (Table 2 of SDAP): Maximum free field acoustic levels

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

3.2 Environmental Protection (Noise) Policy – Sewerage Treatment Plant

The Acoustic Quality Objectives of the Environmental Protection (Noise) Policy 2008 (EPP Noise) have been used as the assessment criteria for the reverse amenity of the Sewerage Treatment Plant.. Operation of the existing plant has been assessed against the Acoustic Quality Objectives as shown in **Table 3.2.1**.

Table 3.2.1 Acoustic Quality Objectives of the Environmental Protection Policy 2008

Sensitive Receptor	Time of Day	Acoustic Quality Objective (Measured at the Receptor) dB(A)			Environmental Value
		$LA_{eq,adj,1hr}$	$LA_{10,adj,1hr}$	$LA_{01,adj,1hr}$	
Dwellings (for outdoors)	Daytime and evening (7am to 10pm)	50	55	65	Health and wellbeing
Dwellings (for indoors)	Daytime and evening (7am to 10pm)	35	40	45	Health and wellbeing
Dwellings (for indoors)	Night-time (10pm to 7am)	30	35	40	Health and wellbeing in relation to the ability to sleep

3.3 EPA Act 1994 – 440T Pumps

An occupier of the premises must not use, or permit the use of, the pump on any day—

(a)before 7a.m, if it makes an audible noise; or

(b)from 7a.m. to 7p.m, if it makes a noise of more than 5dB(A) above the background level; or

(c)from 7p.m. to 10p.m, if it makes a noise of more than 3dB(A) above the background level; or

(d)after 10p.m, if it makes an audible noise.

Inaudible noise is taken as 10 dBA less than the background noise. The background noise at night was LA90 37 dBA. Hence the inaudible noise criteria is LAeq 32 dBA [outside allowing for 5 dBA attenuation through an open window]

3.4 Project Specific Noise Criteria

Considering the criteria discussion above, the project specific noise criteria is summarised in **Table 3.3.1** below**.**

Table 3.3.1 – Summary of all relevant Noise Assessment Criteria

Criteria	Noise Descriptor	Day	Evening	Night
Environmental Protection Policy 2008 Acoustic Quality Objectives & Background Noise Creep				
Dwelling Outdoors	Leq dB(A) – Time Varying	50	54[1]	55[1]
Dwelling Outdoors	Leq dB(A) - Continuous	45	49[1]	35[1]
Dwelling Outdoors	L10 dB(A)	55	45[1]	40[1]
Dwelling Outdoors	L1 dB(A)	65	50[1]	45[1]

Note 1 the night time EPP Noise criteria is based on indoor levels + 5dB(A) to account for an open window

Considering the mechanical plant will mostly be continuous noise, the most appropriate project specific noise criteria that will ensure all noise criteria is met for this for assessment is:

- **LAeq 32 dBA at anytime at the nearest and most affected residence (assuming a 5 dBA noise reduction through an open window)**

4 NOISE IMPACT ASSESSMENT

4.1 Traffic Noise Intrusion

The 10-year design levels for road traffic noise from the Toowoomba Bypass were calculated in accordance with Australian Standard AS2702-1984 Acoustics - Methods for the measurement of road traffic noise and 'Calculation of Road Traffic Noise', 1975-1988. Predicted levels have been calculated using CoRTN prediction models in SoundPLAN 8.2.

All prediction models have limits to their accuracy of prediction. This is due to the inherent nature of the calculation algorithms that go into the design of the models and the assumptions made in the implementation of the model. Atmospheric and meteorological factors are not considered significant at the distances involved.

The model incorporated the Toowoomba Bypass, approximate 3m high houses within the lots, and elevation contour lines. Toowoomba Bypass Road source parameters were taken from a report named "Noise Impact Assessment 25 Tall Oak Drive, Cotswold Hills Client: Ruby Developments PTY LTD Project No. J002130 Status Final Date 8/11/2024 Version 2" prepared by a company called Range Environmental Consultants. Appendix B – 'ADDT Derivation' displays Table 10 and 11 within Range Environmental Consultants' Project No. J002130 Version 2 report.

Table 4.1.1 Noise Source Parameters

Road Parameters	**Toowoomba Bypass**
Proximity from Land Parcel to Noise Source	130 m North
Speed Limit of Noise Source	100 km/hr
Traffic Volumes Average over 24-hrs (2025)	11818
Predicted Traffic Volumes Average over 24-hrs (2035)	16359
Traffic Growth Percentage	3 %
Percentage of Traffic Volume Heavy Vehicles	20 %
Surface Type	Dense Graded Asphalt
Calculated Noise Level Increase (2025-2035)	**0.86 dB**

Table 4.1.2 Predicted Current LA10 18hr (2025) noise levels at dwelling (dBA, free field)

Assessment Location	Measured $L_{A10,18hr}$ 2025	Modelled $L_{A10,18hr}$ 2025
ML1	**60.5**	**60.6**

*Modelled noise levels were found to be within +2 dB of measured values. Therefore, the traffic noise model is considered to have a reasonable degree of fit.

4.2 Traffic Noise Model Results

Table 4.2.1 Predicted LA10, 18hr (2035) noise levels (dBA, free field) at receiver locations with no barrier.

Lot Number	Corrected $L_{A10,18hr}$ Noise Level, dB(A)	SDAP Noise Criteria	Meets Criteria?
1	53.6	57	Yes
2	53.5	57	Yes
3	53.6	57	Yes
4	53.7	57	Yes
5	54.5	57	Yes
6	54	57	Yes
7	52.6	57	Yes
8	49	57	Yes
9	52	57	Yes
10	49.3	57	Yes
11	51.2	57	Yes
12	49.9	57	Yes
13	50.5	57	Yes
14	49.9	57	Yes
15	50.3	57	Yes
16	56.9	57	Yes
17	57	57	Yes
18	53.3	57	Yes
19	52	57	Yes
20	52.5	57	Yes
21	51.2	57	Yes
22	52.2	57	Yes
23	52.3	57	Yes
24	50.4	57	Yes
25	51.4	57	Yes
26	55.6	57	Yes
27	55.5	57	Yes
28	50.6	57	Yes
29	49.2	57	Yes

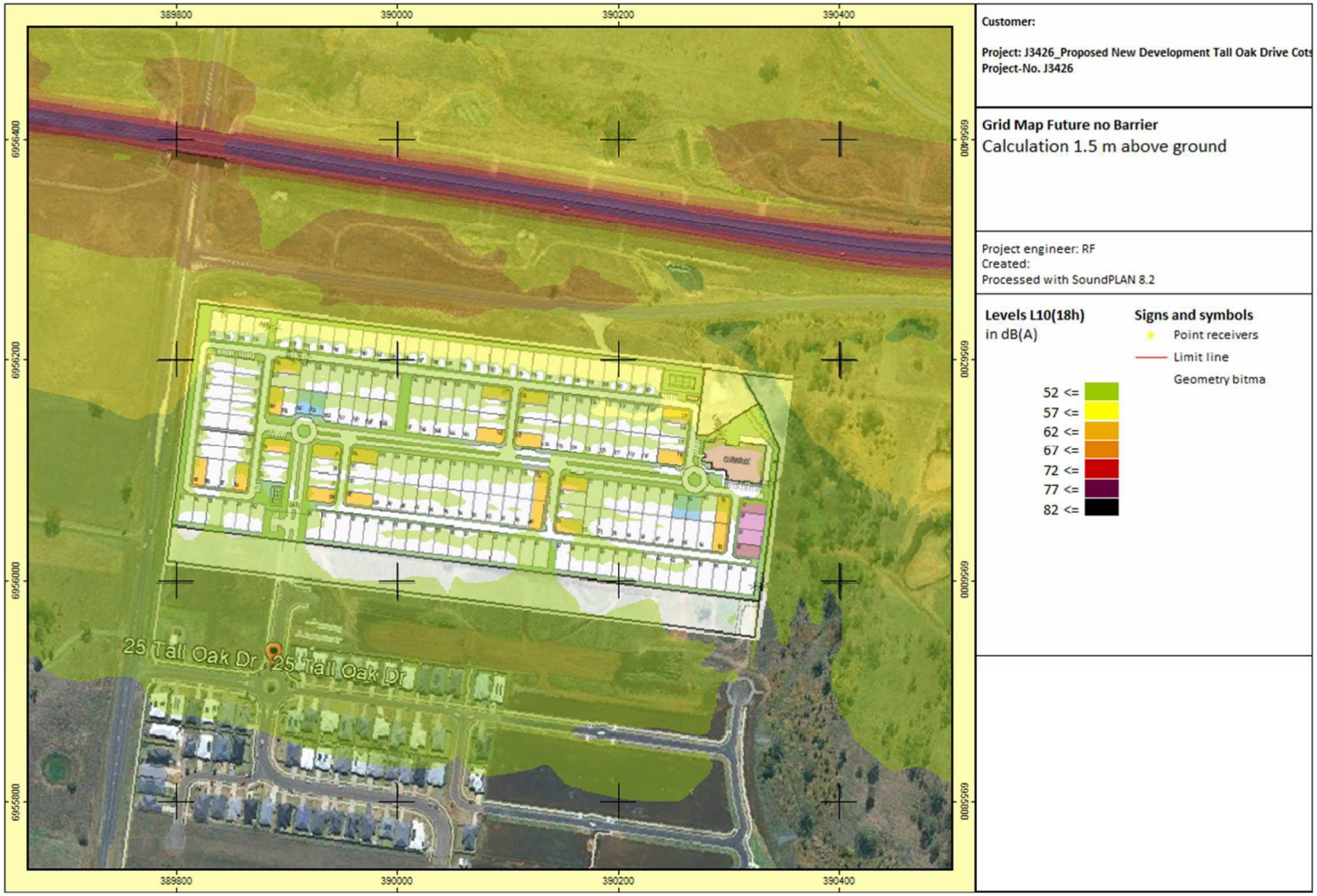
30	53.3	57	Yes
31	52.5	57	Yes
32	52.1	57	Yes
33	51	57	Yes
34	51.8	57	Yes
35	52.2	57	Yes
36	52.6	57	Yes
37	52.5	57	Yes
38	52.9	57	Yes
39	53.2	57	Yes
40	52.8	57	Yes
41	52.7	57	Yes
42	53.5	57	Yes
43	53.4	57	Yes
44	53.7	57	Yes
45	53.6	57	Yes
46	53.3	57	Yes
47	52.3	57	Yes
48	53.5	57	Yes
49	53.8	57	Yes
50	53.6	57	Yes
51	53.5	57	Yes
52	53.4	57	Yes
53	52.9	57	Yes
54	52.8	57	Yes
55	52.7	57	Yes
56	52.3	57	Yes
57	51.9	57	Yes
58	51.8	57	Yes
59	50.7	57	Yes
60	50.1	57	Yes
61	44.9	57	Yes
62	45.6	57	Yes
63	50.3	57	Yes
64	48.6	57	Yes
65	48.8	57	Yes
66	49.5	57	Yes
67	51.8	57	Yes
68	52	57	Yes
69	52.3	57	Yes
70	52.9	57	Yes
71	54.3	57	Yes
72	55.1	57	Yes
73	54.4	57	Yes
74	54.7	57	Yes

75	54.7	57	Yes
76	55.2	57	Yes
77	56.1	57	Yes
78	56.2	57	Yes
79	56.4	57	Yes
80	56.2	57	Yes
81	56.1	57	Yes
82	55.6	57	Yes
83	55.6	57	Yes
84	55.6	57	Yes
85	55	57	Yes
86	54.6	57	Yes
87	52.8	57	Yes
88	45.7	57	Yes
89	51.1	57	Yes
90	50.8	57	Yes
91	51.3	57	Yes
92	51.8	57	Yes
93	50.9	57	Yes
94	52.1	57	Yes
95	52.8	57	Yes
96	53.6	57	Yes
97	53.2	57	Yes
98	54.4	57	Yes
99	53.9	57	Yes
100	53.1	57	Yes
101	46.8	57	Yes
102	49.5	57	Yes
103	51.5	57	Yes
104	55.9	57	Yes
105	56	57	Yes
106	56.2	57	Yes
107	55.5	57	Yes
108	55.6	57	Yes
109	55.5	57	Yes
110	55	57	Yes
111	55	57	Yes
112	55	57	Yes
113	54.5	57	Yes
114	54.1	57	Yes
115	53.1	57	Yes
116	52.5	57	Yes
117	50.8	57	Yes
118	50.1	57	Yes
119	52.9	57	Yes

120	53.3	57	Yes
121	53.2	57	Yes
122	55	57	Yes
123	55.1	57	Yes
124	55.1	57	Yes
125	53.7	57	Yes
126	53.1	57	Yes
127	51.9	57	Yes
128	52.2	57	Yes
129	52.6	57	Yes
130	55.5	57	Yes
131	55.8	57	Yes
132	56.8	57	Yes
133	57	57	No
134	57.6	57	No
135	57.8	57	No
136	57.4	57	No
137	57.4	57	No
138	57.4	57	No
139	57.6	57	No
140	53.4	57	Yes
141	51.4	57	Yes
142	50.7	57	Yes
143	53.3	57	Yes
144	53.6	57	Yes
145	54	57	Yes
146	54.5	57	Yes
147	54.7	57	Yes
148	54.8	57	Yes
149	54.2	57	Yes
150	54.6	57	Yes
151	54.3	57	Yes
152	53.7	57	Yes
153	54.2	57	Yes
154	54.6	57	Yes
155	53.7	57	Yes
156	55.8	57	Yes
157	54.8	57	Yes
158	57	57	No
159	57.2	57	No
160	57.4	57	No
161	57	57	No
162	57.2	57	No
163	57	57	No
164	57.2	57	No

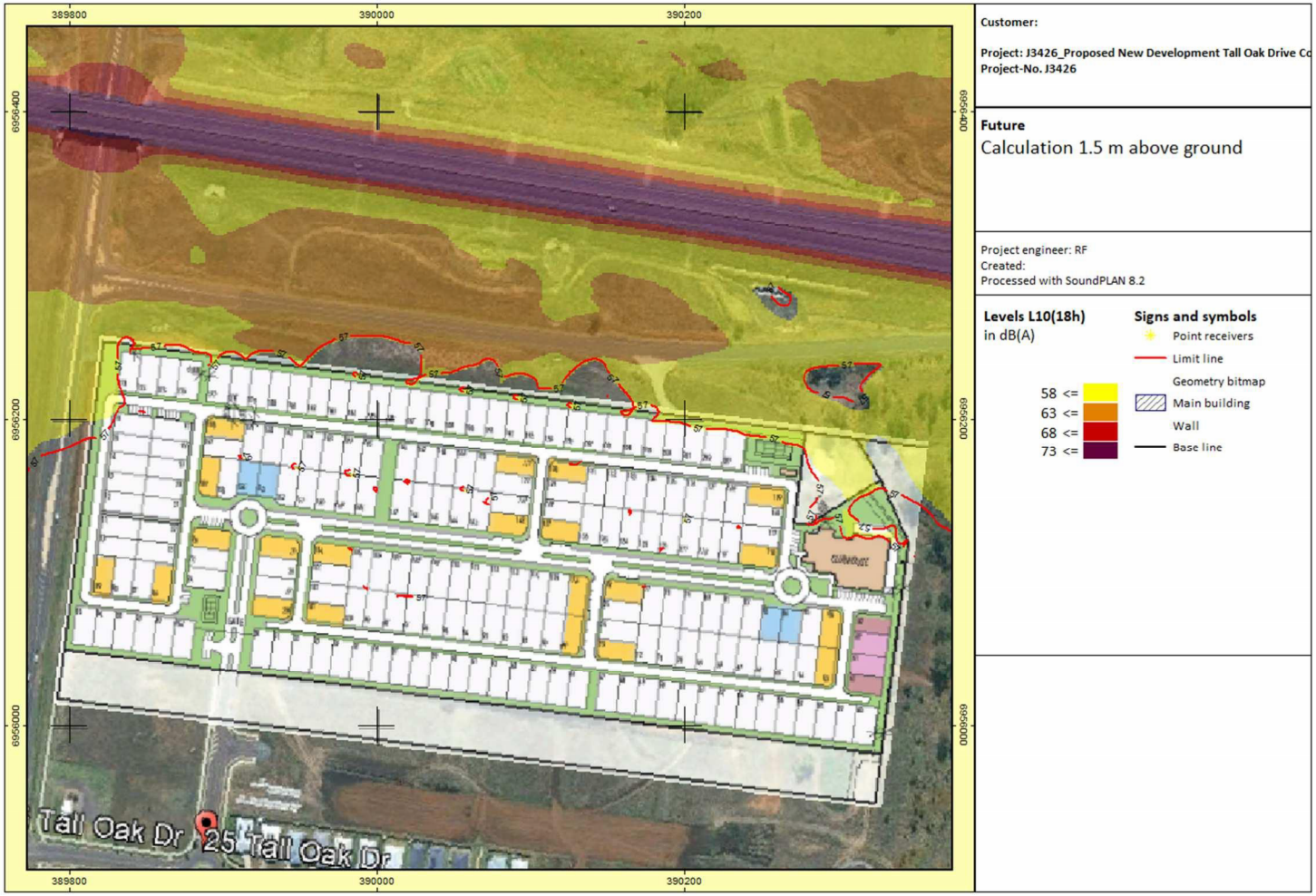
165	57.1	57	No
166	56.5	57	Yes
167	57.1	57	No
168	57.3	57	No
169	57.1	57	No
170	56.7	57	Yes
171	56.2	57	Yes
172	52	57	Yes
173	60.3	57	No
174	60.1	57	No
175	59.8	57	No
176	59.7	57	No
177	59.7	57	No
178	59.7	57	No
179	59.3	57	No
180	60.6	57	No
181	60.7	57	No
182	60.8	57	No
183	60.7	57	No
184	60.7	57	No
185	60.6	57	No
186	60.7	57	No
187	60.7	57	No
188	60.7	57	No
189	60.8	57	No
190	60.6	57	No
191	60.6	57	No
192	60.6	57	No
193	60.5	57	No
194	60.5	57	No
195	60.3	57	No
196	60.4	57	No
197	60.4	57	No
198	60.1	57	No
199	60.5	57	No
200	60.3	57	No
201	60.4	57	No
202	60.2	57	No
203	60.1	57	No
204	54.1	57	Yes
205	49.7	57	Yes
206	56.8	57	Yes
207	54.7	57	Yes

Figure 4.2.1 Noise Model, Noise Contour lines of Private Open Space (1.5 m above ground level) (with no barrier)



After noise barriers are installed, all lots comply with the Prive Open Space noise criteria of LA10 57 dBA as shown in Figure 4.2.2 below.

Figure 4.2.2 Noise Model, Noise Contour lines of Private Open Space (1.5 m above ground level) (with barriers) (with compliance Red line)



4.3 Sewerage Treatment Plant Noise Model Results

Additionally the Sewerage Treatment Plant noise emissions are assessed as part of a reverse amenity criteria. Noise measurements of the Sewerage Treatment Plant have been carried out over a week between the 13th March 2025 and 18th March 2025.

Sound power level of the Sewerage Treatment Plant are listed in Table 4.3.1 below. The sound sources have been modelled in SoundPLAN. The noise emissions used for the various noise sources (taken from Alpha Acoustics Sound Library) are presented in **Table 5.1** below as sound power levels.

Table 4.3.1 Summary of Sewerage Treatment Plant Noise Emissions (Sound Power levels, dBA)

63	125	250	500	1000	2000	4000	8000	dBA
87	83	77	83	82	77	77	79	**86**

Knowing the source sound power level (see above Table 5.1), the sound pressure level can be calculated at a remote location using suitable formulae to account for distance losses, ground absorption, sound barriers, atmospheric effects, etc.

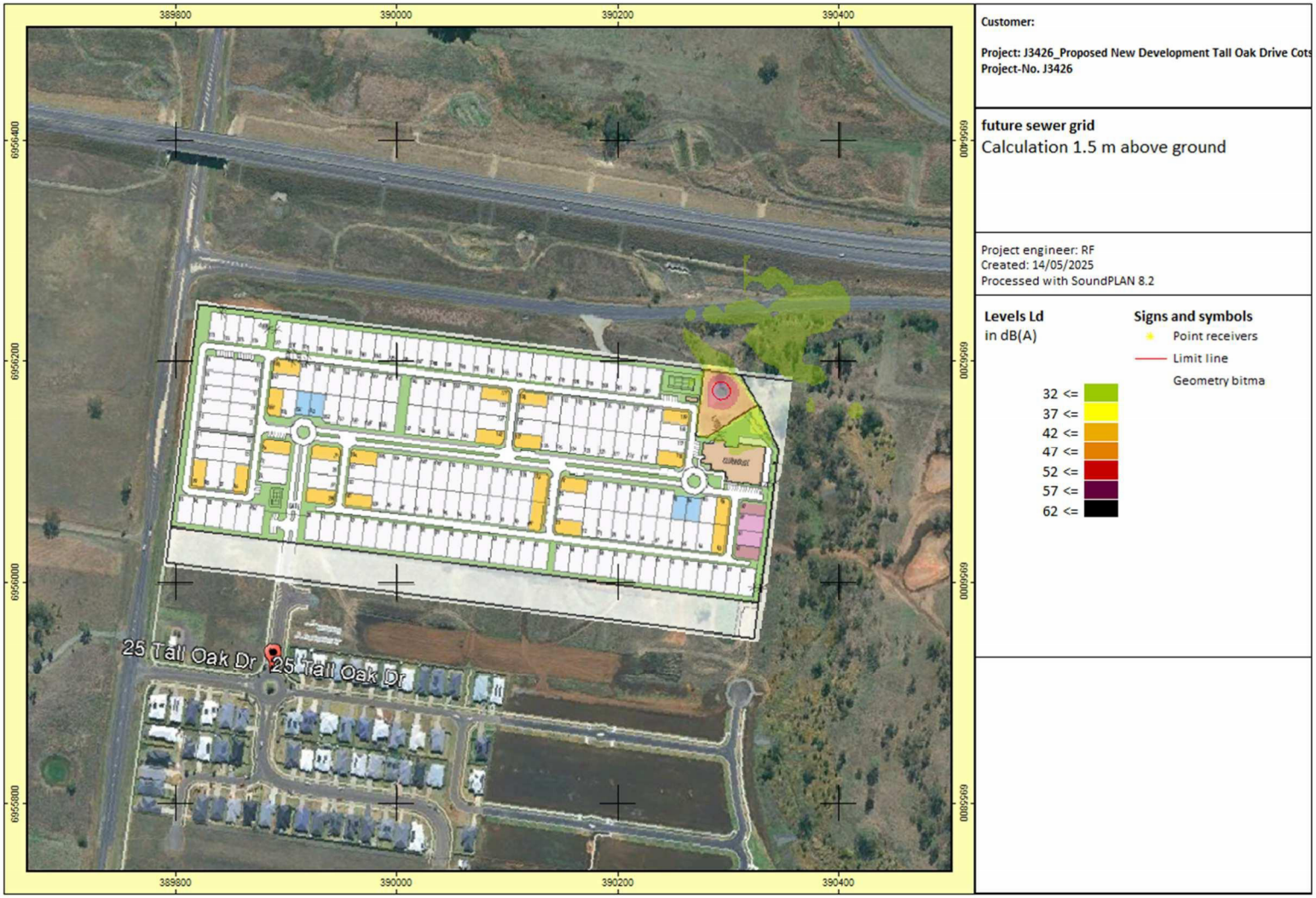
Noise modelling has been conducted using SoundPLAN v8.2 and the prediction methodology *ISO 9613-2: 1996* incorporating manufacturer published sound emission data. We would expect the order of uncertainty to be in the range of +/- 2 dB(A).

The calculated noise levels at the worst affected lots at the subject site (with noise controls) are modelled and shown in Table 4.3.2 below. Noise Controls are shown in Section 4.4.

Table 4.3.2 Modelled noise levels at nearest and most affected sensitive receivers

87Receiver	Type	Address	LAeq, dBA Criteria	LAeq, dBA	Pass ?
R1	Residential	Lot 283	32	25	Yes
R2	Residential	Lot 129	32	26	Yes
R3	Residential	Lot 140	32	26	Yes
R4	Residential	Lot 117	32	27	Yes
R5	Residential	Lot 118	32	26	Yes
R6	Residential	Lot 87	32	16	Yes
R7	Recreation	Clubhouse North	32	30	Yes
R8	Recreation	Clubhouse East	32	20	Yes

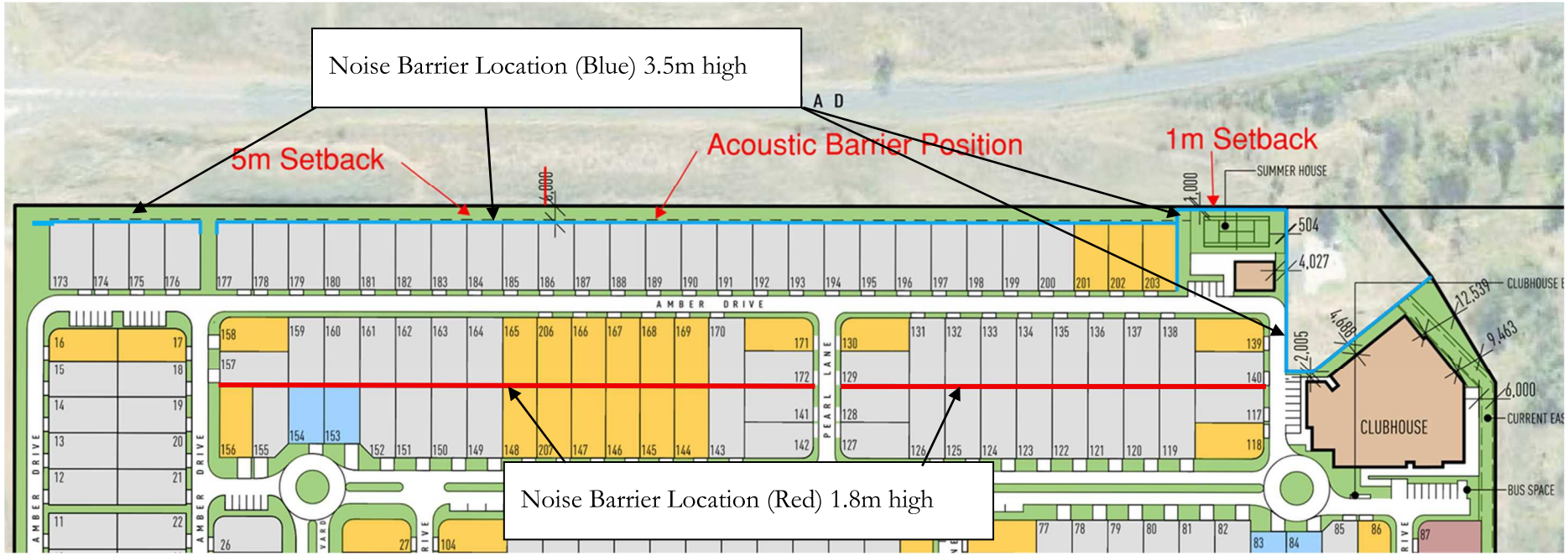
Figure 4.3.1 Noise Model, Noise Contour lines of Reverse Amenity Sewerage Treatment Plant Assessment (with barrier) (with compliance line)



4.4 Noise Barrier Location (Red, Blue)

Figure 4.4.1 shows the noise barrier locations.

Figure 4.4.1 – Noise Barrier Locations



The northern 3.5m-high Red noise barrier is proposed to be situated 5m south of the Property Boundary (PB). This barrier is proposed to extend 5m beyond Lot 173. There is a discontinuity between Lot 176 and 177, incorporating a return wall that extends approx. 5m on the Lot Boundary (LB) of Lot 176 and 177, still at 3.5m-high. The 1.8m-high Blue noise barrier is to be placed on the higher southern lot.

- The 3.5m high boundary noise barrier construction must strictly adhere to the 'Technical Specification - MRTS15 Noise Fences, Transport and Main Roads, 2019.' This specification comprehensively details the required material standards, construction methodologies, and quality control measures necessary to ensure the effective acoustic performance and long-term durability of the noise barriers.

- The 1.8m high internal noise barrier may be constructed from a gap free 25mm thick lapped timber fence or other material with a surface density of at least 15 kg/m2.

Approximate barrier top height requirements are presented in Table 4.4.1. These barrier top heights are calculated based on the assumed barrier base level and the acoustically required barrier height. The barrier top height represents the critical dimension for achieving the specified acoustic performance of the barrier.

Table 4.4.1: Barrier Base, Height, and Top Levels

Lot #	Barrier base	Barrier height	Barrier top
173	523.83	3.5	527.33
174	523.45	3.5	526.95
175	523.42	3.5	526.92
176	523.23	3.5	526.73
177	523.24	3.5	526.74
178	523.05	3.5	526.55
179	522.82	3.5	526.32
180	522.64	3.5	526.14
181	522.47	3.5	525.97
182	522.43	3.5	525.93
183	522.24	3.5	525.74
184	522.05	3.5	525.55
185	522.02	3.5	525.52
186	521.85	3.5	525.35
187	521.67	3.5	525.17
188	521.63	3.5	525.13
189	521.45	3.5	524.95
190	521.28	3.5	524.78
191	521.24	3.5	524.74
192	521.02	3.5	524.52
193	520.84	3.5	524.34
194	520.65	3.5	524.15
195	520.62	3.5	524.12
196	520.45	3.5	523.95
197	520.33	3.5	523.83
198	520.43	3.5	523.93
199	520.3	3.5	523.8
200	520.17	3.5	523.67
201	520.04	3.5	523.54
202	519.91	3.5	523.41
203	519.78	3.5	523.28
around tennis court	519.5	3.5	523
tennis to clubhouse	519.5	3.5	523
156	524.34	1.8	526.14
155	524.66	1.8	526.46
154	525.03	1.8	526.83

153	525.05	1.8	526.85
152	525.28	1.8	527.08
151	525.14	1.8	526.94
150	524.98	1.8	526.78
149	524.82	1.8	526.62
148	524.66	1.8	526.46
207	524.44	1.8	526.24
147	524.39	1.8	526.19
146	524.23	1.8	526.03
145	524.07	1.8	525.87
144	523.91	1.8	525.71
143	523.74	1.8	525.54
141	522.58	1.8	524.38
128	522.58	1.8	524.38
126	522.87	1.8	524.67
125	522.71	1.8	524.51
124	522.55	1.8	524.35
123	522.4	1.8	524.2
122	522.24	1.8	524.04
121	522.08	1.8	523.88
120	521.92	1.8	523.72
119	521.77	1.8	523.57
117	520.33	1.8	522.13

5 CONCLUSION

Alpha Acoustics has been engaged by Gemstone Lifestyle to carry out a road traffic noise assessment a proposed 207 residential lot subdivision at Proposed New Development Tall Oak Drive Cotswold QLD 4350.

This report is an addition to the existing report by Range Environmental Ref J002130 dated 8th November 2024. This report determines the required height and extent of the boundary traffic noise barrier to meet the minimum requirements of state-controlled roads outdoor areas. Additionally, the Sewerage Treatment Plant noise emissions are assessed as part of a reverse amenity criteria. Other acoustic matters are delt within the Range Environmental acoustic report.

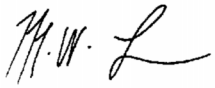
Toowoomba Bypass is adjacent to the proposed subdivision to the north of the site. Due to the sites' proximity to Toowoomba Bypass and the number of lot divisions (205 lots), the proposed development has been assessed against acoustic issues contained within:

- State Development Assessment Provisions (SDAP) Version 3.0

This road traffic noise assessment was undertaken in accordance with the Transport Noise Management Code of Practice Volume 1 - Road Traffic Noise (2013) (hereafter 'RTN Code') to address SDAP State Code 1 Development in a State Controlled Road Environment (version 3).

The following conclusions apply to this assessment:

- The road traffic noise assessment including predicted 2035 traffic noise levels across the site were assessed against the SDAP traffic noise criteria.
- Traffic noise modelling demonstrates all proposed lots satisfy the SDAP Outdoor traffic noise criteria **given an acoustic barrier construction and location is outlined in section 4.4 of this report.**
- A reverse amenity assessment of the existing Sewerage Treatment Plant has been carried out and an **acoustic barrier construction and location is outlined in section 4.4 of this report.**



MATTHEW FISHBURN BE(Mech) Hons, MAAS, MIEAust, CPEng, RPEQ [14356]

Principal Consulting Acoustical Engineer

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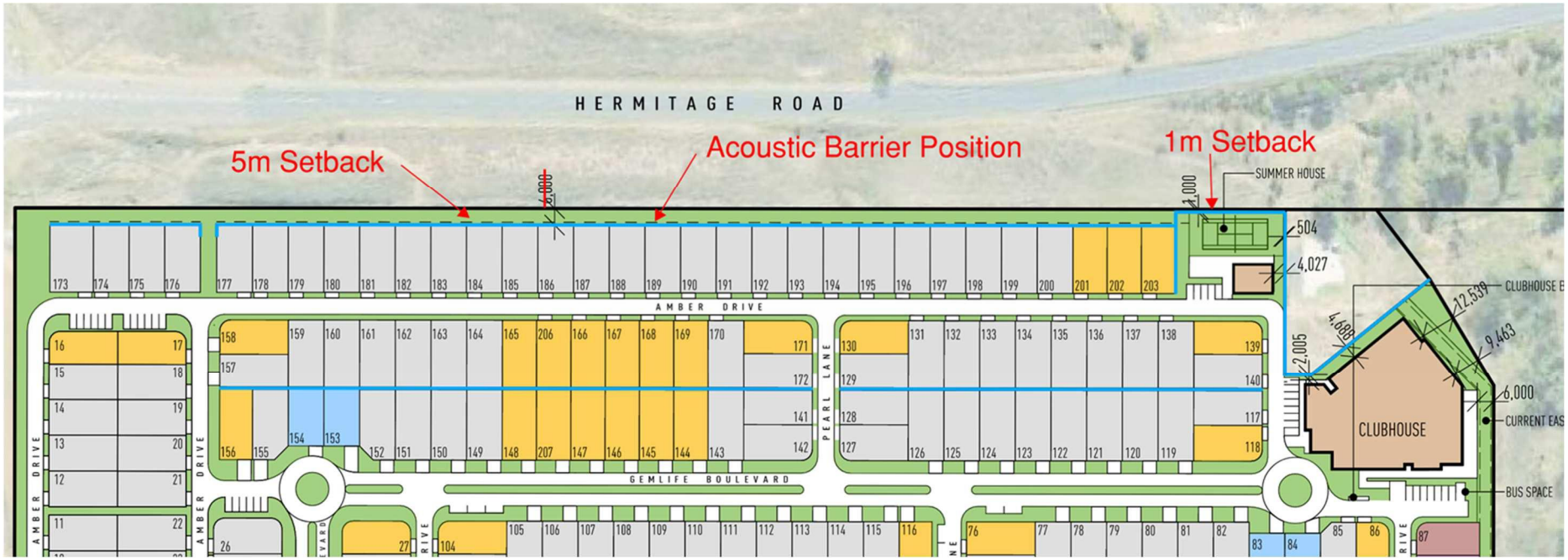
APPENDIX A – DEVELOPMENT PLANS

LOT SUBDIVISION PLAN



APPENDIX B – ADDT DERIVATION

The traffic volume information used in this report was sourced and extrapolated from another report named "Noise Impact Assessment 25 Tall Oak Drive, Cotswold Hills Client: Ruby Developments PTY LTD Project No. J002130 Status Final Date 8/11/2024 Version 2" prepared by a company called Range Environmental Consultants. The following tables (Table 10 and 11) is an exert from that report.

Table 10 Warrego Highway/Toowoomba Bypass traffic projection calculations

Road	Vehicles per 24 hr 18hr volume is 94% of 24 hr		Growth (%p.a.)	HV %	Speed (km/hr)	Source Height (m)	Surface[3]
	2020	2034					
Warrego Highway / Toowoomba Bypass	10500	15882	3%	20%	100	0.5	DGA

The Warrego Highway/Toowoomba Bypass traffic flows are nominal in the absence of published data (Table 10) and were validated at the noise measurement location (Table 8). Validation was based on the measured $L_{10,18hr}$ from 18 March 2020. The modelled levels were $L_{10,18hr}$ and were façade-affected. The modelled levels for other noise level descriptors (e.g. $L_{eq,1hr}$) were derived from the predicted levels using the measured relationships on 18 March 2020, which are shown below in Table 11.

Table 11 Noise levels measured on 18 March 2020, free field

Time of day	L_{01}	L_{10}	L_{90}	L_{eq}
Day	65	53	42	52
Evening	59	52	43	49
Night	57	48	32	47
Highest Day 1hr	-	-	-	58
Highest Night 1hr	-	-	-	53
Calculation of Road Traffic Noise 18hr	-	52	42	-
24 hr average max / L_{eq}	61	-	-	50

APPENDIX C – NOISE MODEL OUTPUTS

EXISTING

J3426_Proposed New Development Tall Oak Drive Cotswold QLD 4350
Assessed receiver levels **2**

Receiver	L10(18h) dB(A)	
Cal pt	60.6	

FUTURE NO BARRIER

J3426_Proposed New Development Tall Oak Drive Cotswold QLD 4350 Assessed receiver levels	2

Receiver	L10(18h) dB(A)	
1	53.6	
2	53.5	
3	53.6	
4	53.7	
5	54.5	
6	54.0	
7	52.6	
8	49.0	
9	52.0	
10	49.3	
11	51.2	
12	49.9	
13	50.5	
14	49.9	
15	50.3	
16	56.9	
17	57.0	
18	53.3	
19	52.0	
20	52.5	
21	51.2	
22	52.2	
23	52.3	
24	50.4	
25	51.4	
26	55.6	
27	55.5	
28	50.6	
29	49.2	
30	53.3	
31	52.5	
32	52.1	
33	51.0	
34	51.8	
35	52.2	
36	52.6	
37	52.5	
38	52.9	
39	53.2	
40	52.8	
41	52.7	

J3426_Proposed New Development Tall Oak Drive Cotswold QLD 4350 Assessed receiver levels	2

Receiver	L10(18h) dB(A)	
42	53.5	
43	53.4	
44	53.7	
45	53.6	
46	53.3	
47	52.3	
48	53.5	
49	53.8	
50	53.6	
51	53.5	
52	53.4	
53	52.9	
54	52.8	
55	52.7	
56	52.3	
57	51.9	
58	51.8	
59	50.7	
60	50.1	
61	44.9	
62	45.6	
63	50.3	
64	48.6	
65	48.8	
66	49.5	
67	51.8	
68	52.0	
69	52.3	
70	52.9	
71	54.3	
72	55.1	
73	54.4	
74	54.7	
75	54.7	
76	55.2	
77	56.1	
78	56.2	
79	56.4	
80	56.2	
81	56.1	
82	55.6	

J3426_Proposed New Development Tall Oak Drive Cotswold QLD 4350 Assessed receiver levels	2

Receiver	L10(18h) dB(A)	
83	55.6	
84	55.6	
85	55.0	
86	54.6	
87	52.8	
88	45.7	
89	51.1	
90	50.8	
91	51.3	
92	51.8	
93	50.9	
94	52.1	
95	52.8	
96	53.6	
97	53.2	
98	54.4	
99	53.9	
100	53.1	
101	46.8	
102	49.5	
103	51.5	
104	55.9	
105	56.0	
106	56.2	
107	55.5	
108	55.6	
109	55.5	
110	55.0	
111	55.0	
112	55.0	
113	54.5	
114	54.1	
115	53.1	
116	52.5	
117	50.8	
118	50.1	
119	52.9	
120	53.3	
121	53.2	
122	55.0	
123	55.1	

J3426_Proposed New Development Tall Oak Drive Cotswold QLD 4350 Assessed receiver levels	2

Receiver	L10(18h) dB(A)	
124	55.1	
125	53.7	
126	53.1	
127	51.9	
128	52.2	
129	52.6	
130	55.5	
131	55.8	
132	56.8	
133	57.0	
134	57.6	
135	57.8	
136	57.4	
137	57.4	
138	57.4	
139	57.6	
140	53.4	
141	51.4	
142	50.7	
143	53.3	
144	53.6	
145	54.0	
146	54.5	
147	54.7	
148	54.8	
149	54.2	
150	54.6	
151	54.3	
152	53.7	
153	54.2	
154	54.6	
155	53.7	
156	55.8	
157	54.8	
158	57.0	
159	57.2	
160	57.4	
161	57.0	
162	57.2	
163	57.0	
164	57.2	

J3426_Proposed New Development Tall Oak Drive Cotswold QLD 4350 Assessed receiver levels	2

Receiver	L10(18h) dB(A)	
165	57.1	
166	56.5	
167	57.1	
168	57.3	
169	57.1	
170	56.7	
171	56.2	
172	52.0	
173	60.3	
174	60.1	
175	59.8	
176	59.7	
177	59.7	
178	59.7	
179	59.3	
180	60.6	
181	60.7	
182	60.8	
183	60.7	
184	60.7	
185	60.6	
186	60.7	
187	60.7	
188	60.7	
189	60.8	
190	60.6	
191	60.6	
192	60.6	
193	60.5	
194	60.5	
195	60.3	
196	60.4	
197	60.4	
198	60.1	
199	60.5	
200	60.3	
201	60.4	
202	60.2	
203	60.1	
204	54.1	
205	49.7	

APPENDIX D – METEOROLOGICAL DATA

Date	Time	Wind Speed (m/s)	Rain (mm)
13/03/2025	10:30:00 AM	0.9566094	0
13/03/2025	10:45:00 AM	1.461556	0
13/03/2025	11:00:00 AM	1.459334	0
13/03/2025	11:15:00 AM	1.304	0
13/03/2025	11:30:00 AM	1.576001	0
13/03/2025	11:45:00 AM	1.697776	0
13/03/2025	12:00:00 PM	1.905889	0
13/03/2025	12:15:00 PM	1.905111	0
13/03/2025	12:30:00 PM	1.827335	0
13/03/2025	12:45:00 PM	1.483444	0
13/03/2025	1:00:00 PM	1.634333	0
13/03/2025	1:15:00 PM	1.390666	0
13/03/2025	1:30:00 PM	1.602221	0
13/03/2025	1:45:00 PM	1.540445	0
13/03/2025	2:00:00 PM	1.82611	0
13/03/2025	2:15:00 PM	1.423666	0
13/03/2025	2:30:00 PM	1.640556	0
13/03/2025	2:45:00 PM	1.651668	0
13/03/2025	3:00:00 PM	1.554777	0
13/03/2025	3:15:00 PM	1.679221	0
13/03/2025	3:30:00 PM	1.622333	0
13/03/2025	3:45:00 PM	1.630667	0
13/03/2025	4:00:00 PM	1.582443	0
13/03/2025	4:15:00 PM	1.526443	0
13/03/2025	4:30:00 PM	1.444221	0
13/03/2025	4:45:00 PM	1.280334	0
13/03/2025	5:00:00 PM	1.406222	0
13/03/2025	5:15:00 PM	1.033778	0
13/03/2025	5:30:00 PM	1.039444	0
13/03/2025	5:45:00 PM	0.6800001	0
13/03/2025	6:00:00 PM	0.7683338	0
13/03/2025	6:15:00 PM	0.6834452	0
13/03/2025	6:30:00 PM	0.5323333	0
13/03/2025	6:45:00 PM	0.6184444	0
13/03/2025	7:00:00 PM	1.052445	0
13/03/2025	7:15:00 PM	1.015667	0
13/03/2025	7:30:00 PM	0.9382222	0
13/03/2025	7:45:00 PM	1.094111	0
13/03/2025	8:00:00 PM	1.325667	0
13/03/2025	8:15:00 PM	1.312669	0
13/03/2025	8:30:00 PM	1.166111	0
13/03/2025	8:45:00 PM	1.442112	0

13/03/2025	9:00:00 PM	1.598335	0
13/03/2025	9:15:00 PM	1.597112	0
13/03/2025	9:30:00 PM	1.702557	0
13/03/2025	9:45:00 PM	1.557445	0
13/03/2025	10:00:00 PM	1.859443	0
13/03/2025	10:15:00 PM	1.754222	0
13/03/2025	10:30:00 PM	1.78289	0
13/03/2025	10:45:00 PM	1.785221	0
13/03/2025	11:00:00 PM	1.808332	0
13/03/2025	11:15:00 PM	1.696	0
13/03/2025	11:30:00 PM	1.706334	0
13/03/2025	11:45:00 PM	1.803	0
14/03/2025	12:00:00 AM	1.432668	0
14/03/2025	12:15:00 AM	1.662111	0
14/03/2025	12:30:00 AM	1.628443	0
14/03/2025	12:45:00 AM	1.663223	0
14/03/2025	1:00:00 AM	1.732001	0
14/03/2025	1:15:00 AM	1.593776	0
14/03/2025	1:30:00 AM	1.475222	0
14/03/2025	1:45:00 AM	2.246998	0
14/03/2025	2:00:00 AM	1.826222	0
14/03/2025	2:15:00 AM	2.097443	0
14/03/2025	2:30:00 AM	1.853001	0
14/03/2025	2:45:00 AM	1.681779	0
14/03/2025	3:00:00 AM	1.679023	0
14/03/2025	3:15:00 AM	1.547497	0
14/03/2025	3:30:00 AM	1.659489	0
14/03/2025	3:45:00 AM	1.353668	0
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14/03/2025	4:45:00 AM	1.291324	0
14/03/2025	5:00:00 AM	1.149002	0
14/03/2025	5:15:00 AM	1.204106	0
14/03/2025	5:30:00 AM	1.144383	0
14/03/2025	5:45:00 AM	0.9400663	0
14/03/2025	6:00:00 AM	1.231222	0
14/03/2025	6:15:00 AM	1.347333	0
14/03/2025	6:30:00 AM	1.592445	0
14/03/2025	6:45:00 AM	1.468075	0
14/03/2025	7:00:00 AM	1.54373	0
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14/03/2025	7:30:00 AM	1.755778	0
14/03/2025	7:45:00 AM	1.927892	0
14/03/2025	8:00:00 AM	2.007677	0

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14/03/2025	8:30:00 AM	1.904445	0
14/03/2025	8:45:00 AM	1.758112	0
14/03/2025	9:00:00 AM	1.757222	0
14/03/2025	9:15:00 AM	1.784667	0
14/03/2025	9:30:00 AM	1.433777	0
14/03/2025	9:45:00 AM	1.595223	0
14/03/2025	10:00:00 AM	1.578557	0
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14/03/2025	1:45:00 PM	1.758889	0
14/03/2025	2:00:00 PM	1.719778	0
14/03/2025	2:15:00 PM	1.98789	0
14/03/2025	2:30:00 PM	1.670555	0
14/03/2025	2:45:00 PM	1.709332	0
14/03/2025	3:00:00 PM	1.809224	0
14/03/2025	3:15:00 PM	1.712445	0
14/03/2025	3:30:00 PM	1.557668	0
14/03/2025	3:45:00 PM	1.691112	0
14/03/2025	4:00:00 PM	1.46989	0
14/03/2025	4:15:00 PM	1.816555	0
14/03/2025	4:30:00 PM	1.725888	0
14/03/2025	4:45:00 PM	1.496223	0
14/03/2025	5:00:00 PM	1.523334	0
14/03/2025	5:15:00 PM	1.876889	0
14/03/2025	5:30:00 PM	1.439002	0
14/03/2025	5:45:00 PM	1.100113	0
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14/03/2025	7:15:00 PM	0.6081113	0

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14/03/2025	8:00:00 PM	1.019112	0
14/03/2025	8:15:00 PM	0.649444	0
14/03/2025	8:30:00 PM	0.744444	0
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14/03/2025	9:15:00 PM	1.518112	0
14/03/2025	9:30:00 PM	1.603667	0
14/03/2025	9:45:00 PM	1.615445	0
14/03/2025	10:00:00 PM	1.177889	0
14/03/2025	10:15:00 PM	1.499223	0
14/03/2025	10:30:00 PM	1.396557	0
14/03/2025	10:45:00 PM	1.588333	0
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14/03/2025	11:15:00 PM	1.608889	0
14/03/2025	11:30:00 PM	1.611889	0
14/03/2025	11:45:00 PM	1.728555	0
15/03/2025	12:00:00 AM	1.887109	0
15/03/2025	12:15:00 AM	1.634111	0
15/03/2025	12:30:00 AM	1.842111	0
15/03/2025	12:45:00 AM	1.654222	0
15/03/2025	1:00:00 AM	1.777889	0
15/03/2025	1:15:00 AM	1.852223	0
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18/03/2025	8:45:00 PM	1.555717	0
18/03/2025	9:00:00 PM	1.517444	0
18/03/2025	9:15:00 PM	1.186761	0
18/03/2025	9:30:00 PM	-99.94	0
18/03/2025	9:45:00 PM	-99.94	0
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18/03/2025	10:30:00 PM	1.064182	0
18/03/2025	10:45:00 PM	1.287333	0
18/03/2025	11:00:00 PM	1.10555	0
18/03/2025	11:15:00 PM	1.686541	0
18/03/2025	11:30:00 PM	1.867258	0
18/03/2025	11:45:00 PM	1.843001	0
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19/03/2025	12:45:00 AM	1.508999	0
19/03/2025	1:00:00 AM	1.322221	0
19/03/2025	1:15:00 AM	1.131999	0
19/03/2025	1:30:00 AM	1.214333	0
19/03/2025	1:45:00 AM	1.084222	0
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19/03/2025	2:15:00 AM	1.163666	0
19/03/2025	2:30:00 AM	1.220555	0
19/03/2025	2:45:00 AM	1.125668	0
19/03/2025	3:00:00 AM	1.154999	0
19/03/2025	3:15:00 AM	1.533444	0
19/03/2025	3:30:00 AM	1.541335	0
19/03/2025	3:45:00 AM	1.312667	0
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19/03/2025	4:15:00 AM	1.675668	0
19/03/2025	4:30:00 AM	1.671777	0
19/03/2025	4:45:00 AM	1.277111	0
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19/03/2025	5:15:00 AM	1.583889	0
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19/03/2025	6:30:00 AM	1.261667	0
19/03/2025	6:45:00 AM	1.587334	0
19/03/2025	7:00:00 AM	1.321444	0
19/03/2025	7:15:00 AM	1.195334	0
19/03/2025	7:30:00 AM	1.476001	0
19/03/2025	7:45:00 AM	1.542001	0
19/03/2025	8:00:00 AM	1.650889	0
19/03/2025	8:15:00 AM	1.605778	0
19/03/2025	8:30:00 AM	1.795889	0
19/03/2025	8:45:00 AM	1.976001	0
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19/03/2025	10:00:00 AM	2.432446	0
19/03/2025	10:15:00 AM	2.490558	0
19/03/2025	10:30:00 AM	2.297889	0
19/03/2025	10:45:00 AM	2.664891	0
19/03/2025	11:00:00 AM	2.541116	0
19/03/2025	11:15:00 AM	2.362223	0
19/03/2025	11:30:00 AM	2.382447	0
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19/03/2025	7:30:00 PM	1.208333	0
19/03/2025	7:45:00 PM	1.117333	0
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19/03/2025	8:15:00 PM	1.169001	0
19/03/2025	8:30:00 PM	1.036778	0
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19/03/2025	9:30:00 PM	1.019999	0
19/03/2025	9:45:00 PM	0.7858886	0
19/03/2025	10:00:00 PM	0.8042223	0
19/03/2025	10:15:00 PM	0.5337787	0
19/03/2025	10:30:00 PM	0.7182025	0
19/03/2025	10:45:00 PM	0.6750837	0
19/03/2025	11:00:00 PM	1.057223	0

19/03/2025	11:15:00 PM	0.8990007	0
19/03/2025	11:30:00 PM	0.8571112	0
19/03/2025	11:45:00 PM	0.8913432	0
20/03/2025	12:00:00 AM	0.914794	0
20/03/2025	12:15:00 AM	0.9755816	0
20/03/2025	12:30:00 AM	1.335594	0
20/03/2025	12:45:00 AM	1.387458	0
20/03/2025	1:00:00 AM	1.094001	0
20/03/2025	1:15:00 AM	1.172524	0
20/03/2025	1:30:00 AM	1.053334	0
20/03/2025	1:45:00 AM	0.9942299	0
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20/03/2025	6:00:00 AM	0.9934438	0
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20/03/2025	6:30:00 AM	0.904333	0
20/03/2025	6:45:00 AM	1.033888	0
20/03/2025	7:00:00 AM	0.9912229	0
20/03/2025	7:15:00 AM	1.132333	0
20/03/2025	7:30:00 AM	1.031778	0
20/03/2025	7:45:00 AM	1.270666	0
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20/03/2025	9:45:00 AM	1.452444	0
20/03/2025	10:00:00 AM	1.756778	0
20/03/2025	10:15:00 AM	1.388001	0

20/03/2025	10:30:00 AM	1.566889	0
20/03/2025	10:45:00 AM	1.517334	0
20/03/2025	11:00:00 AM	1.485	0
20/03/2025	11:15:00 AM	1.425668	0
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20/03/2025	11:45:00 AM	2.172556	0
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20/03/2025	12:30:00 PM	1.922	0
20/03/2025	12:45:00 PM	2.174113	0
20/03/2025	1:00:00 PM	1.902445	0
20/03/2025	1:15:00 PM	1.902779	0
20/03/2025	1:30:00 PM	1.879778	0
20/03/2025	1:45:00 PM	1.476546	0

APPENDIX E – GLOSSARY OF ACOUSTIC TERMS

The following is a brief description of the technical terms used to describe traffic noise to assist in understanding the technical issues presented in this document.

Event maximum sound pressure level (LA%,adj,T), L01

The L01 level is calculated as the noise level equalled and exceeded for 1% of the measurement time, for example 9 seconds in any 15 minute interval. L01 is an appropriate level to characterise single events, such as from impulsive or distinctive pass-by noise. In this Report, the measured L01 levels for day/evening/night are not averaged but are arranged from low to high in the relevant day/evening/night interval and the value that is found at the 90th percentile (L10 of L01 sample) in the interval is recorded as its "L01" level. The level can be adjusted for tonality or impulsiveness.

Average maximum sound pressure level (LA%,adj, T), L10

The "L10" level is an indicator of "steady-state" noise or intrusive noise conditions from traffic, music and other relatively non-impulsive noise sources. The L10 level is calculated as the noise level equalled and exceeded for 10% the measurement time, for example 90 seconds in any 15 minute interval. The measured L10 time-intervals for day/evening/night are arithmetically averaged to present the "average maximum" levels of the environment for day/evening/night. The level can be adjusted for tonality or impulsiveness.

Background sound pressure level (LA90,T), L90

Commonly called the "L90" or "background" level and is an indicator of the quietest times of day, evening or night. The L90 level is calculated as the noise level equalled and exceeded for 90% the measurement time. The measured L90 time-intervals are arithmetically averaged to present the "average background" levels of the environment for day/evening/night. The level is recorded in the absence of any noise under investigation. The level is not adjusted for tonality or impulsiveness.

Equivalent Continuous or time average sound pressure level (LAeq,T), Leq

Commonly called the "Leq" level it is the logarithmic average noise level from all sources far and near. The maximum 1-hour levels within the day/evening/night time intervals are referenced for building design. The level can be adjusted for tonality.

Façade-adjusted level

A sound level that is measured at a distance of 1.0 metre from a wall or facade. The level is nominally 2.5 dB higher than the free-field level.

Free-field level

A sound level that is measured at a distance of more than 3.5 metres from a wall or facade.

Weighted Sound Reduction Index, Rw

A single number value used to compare the sound reduction index of building elements. Similar to the Sound Transmission Class (STC) rating that is still in common use. Rw and STC are not identical though may be considered, for most applications, as being interchangeable. A high Rw indicates high sound reduction.