



MARSHALL DAY  
Acoustics



54 GREEN LANE  
NOISE EFFECTS ASSESSMENT  
Rp 002 R05 20210447 | 7 March 2022

Project: **54 GREEN LANE**

Prepared for: **Ruru Homes**  
**370 Kaiteriteri Sandy Bay Road**  
**Motueka 7197**

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Report No.: **Rp 002 R05 20210447**

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## 1.0 INTRODUCTION

Ruru Homes has requested that Marshall Day Acoustics prepares a noise effects assessment for proposed light industrial activities at 54 Green Lane, Motueka, in accordance with Tasman Resource Management Plan (TRMP) and the Resource Management Act.

During the first stage of the development, small homes would be manufactured within the north-east area of the subject site, with the capacity to build up to 9 homes simultaneously. Materials would be transported to and from the site via a driveway accessed on Green Lane. Stage 2 of the proposal would see manufacturing of small homes expanded resulting in the capacity to build 18 homes simultaneously.

This report outlines the assessment of effects for the associated operational noise for Stages 1 and 2. Noise relating to site establishment has not been considered in this report.

A glossary of acoustic terminology used in this report is included as Appendix A.

## 2.0 SITE AND ACTIVITY DESCRIPTION

### 2.1 Subject Site

The subject site is located at 54 Green Lane, Motueka. It is zoned Rural 1, as defined by the TRMP. The surrounding noise sensitive sites are also zoned Rural 1. Activities contributing to the existing surrounding noise climate include the Motueka airport, Golden Bay Fruit packing facility and traffic on the local road network.

The subject site is shown in Figure 1. Within Figure 1, we have identified the closest noise receivers and their corresponding zoning in the TRMP. These receivers are described in Section 2.2 of this report.

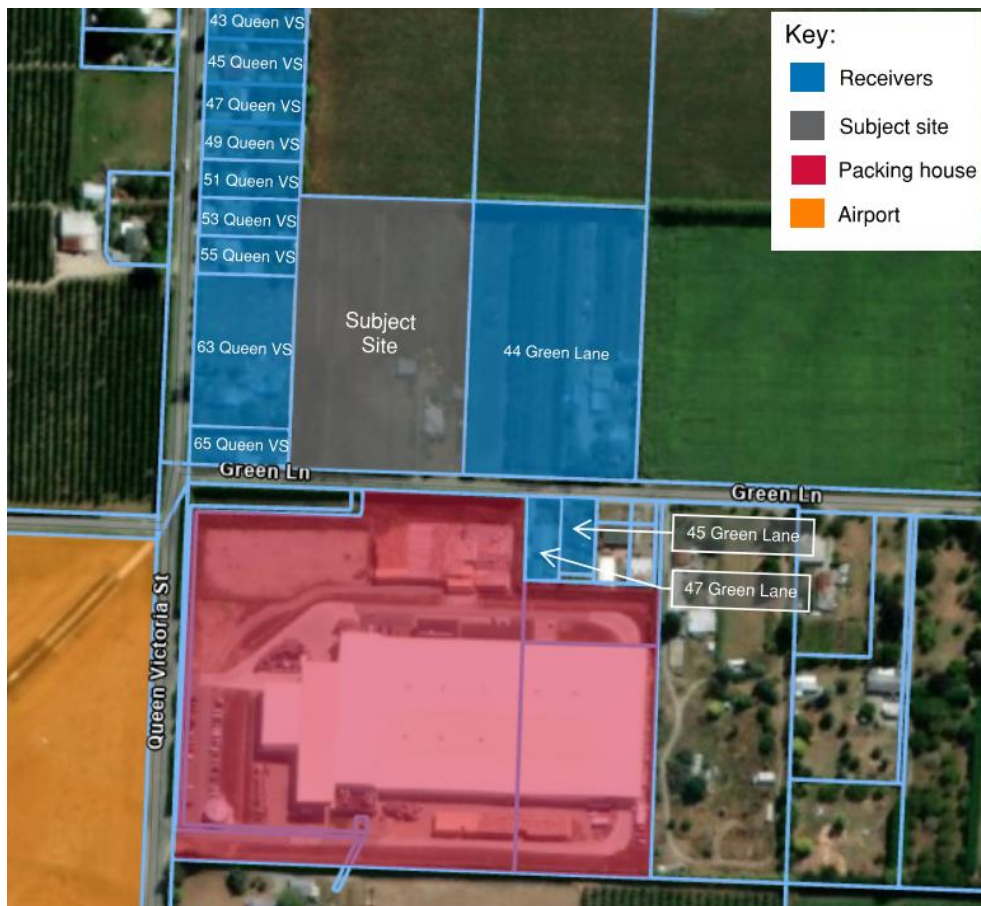


Figure 1: Site and surroundings (Base image source: google maps)

## 2.2 Assessment Locations

For the purpose of this assessment, we have predicted and assessed the subject site operational noise levels at the notional boundary of dwellings. This is consistent with the assessment locations for sites zoned rural as outlined in the TRMP.

The identified assessment locations closest to the subject site are as follows:

### All sites zoned Rural 1

- 43 Queen Victoria Street (Lot 1 DP 18912)
- 45 Queen Victoria Street (Lot 2 DP 18912)
- 47 Queen Victoria Street (Lot 4 DP 1512)
- 49 Queen Victoria Street (Lot 5 DP 1512)
- 51 Queen Victoria Street (Lot 6 DP 1512)
- 53 Queen Victoria Street (Lot 7 DP 1512)
- 55 Queen Victoria Street (Lot 8 DP 1512)
- 63 Queen Victoria Street (Lot 9 DP 1512)
- 65 Queen Victoria Street (Lot 10 DP 1512)
- 44 Green Lane (Lot 14 DP 1512)
- 45 Green Lane (Lot 20 DP 1512)
- 47 Green Lane (Lot 1 DP 7957)

These properties are all single-storey dwellings. Other sites in the area may be exposed to noise from the activity. However, noise levels would be less than those received at our assessment locations, due to increased propagation distances and screening from intervening buildings.

## 2.3 Activity Description

The proposal is to develop a site for the manufacture of 'small units'.

During Stage 1, the manufacturing of the small units is occurring outside, within the north-eastern area of the subject site. Up to nine small homes would be manufactured on site at a time, with up to 30 builders. A framing station, located on the eastern boundary, will contain the circular saw, grinder and a nail gun within a shipping container enclosure with a PVC arched roof.

Stage 2 of the proposal is scheduled to commence in July 2022 and would see the manufacture of small homes expand within the subject site. With the implementation of Stage 2, there would be capacity to manufacture 18 small homes at a time, with up to 60 builders.

Figure 2 shows the proposed subject site layout following commencement of Stage 2. The subject site would include a staff carpark located on the western boundary. From discussion with the Client, we understand that 60 vehicle movements would occur between the hours of 7am – 9am and again between 3pm – 5pm via the main access way to the south of the subject site, accessed via Green Lane.

A combination of shipping containers and plywood fencing around the proposed manufacturing area would provide mitigation to surrounding noise sensitive receivers during Stage 1 & 2 operations. To prevent flooding, the plywood fencing will incorporate a mass loaded vinyl section to the lower portion of the fencing to allow stormwater flow. Figure 2 sets out the proposed container and plywood fencing locations. The barrier indicated on the eastern boundary could be the combination of shipping containers and plywood fencing, as shown to the west of the manufacture area.

Other mitigation options such as earth bunding around the site perimeter have been explored. However, due to flood control, a continuous bund is not practical. If apertures within the bunding were included to assist with flood control, a significant reduction in the noise attenuation performance would be observed.

Approximately 3 to 4 completed homes would be stored in the south-west area of the subject site. No manufacturing works would occur on these units.

Manufacturing hours would be 8am to 4:30pm Monday to Friday. We understand that currently, no manufacturing is proposed for Saturdays. However, the Client has requested we consider the noise effects between 8am and 3pm Saturdays, to allow for potential future operations. No manufacturing activities would occur on Sundays or public holidays.

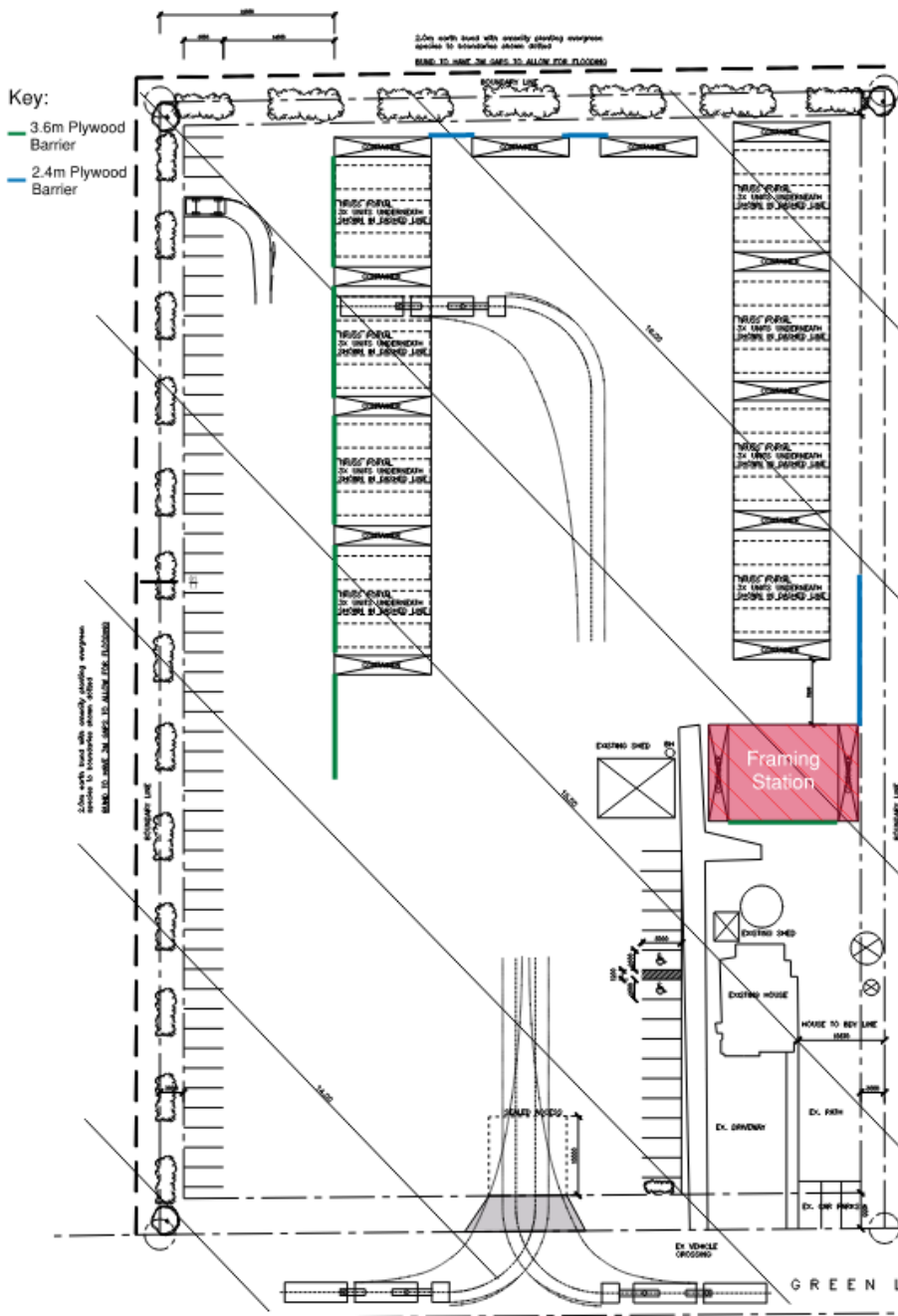


Figure 2: Site layout (source: Allure Architecture)

### 3.0 CURRENT AMBIENT AND BACKGROUND NOISE ENVIRONMENT

We determined the current ambient and background noise levels by measurement at selected sites, representative of the closest noise sensitive receivers, over the period 6<sup>th</sup> – 22<sup>nd</sup> December 2021. Noise level surveys were undertaken at two locations by means of continuous data logging extending over these sixteen days.

Each logger was positioned in free field conditions and located on the aspect of the receiver properties that would potentially be most exposed to noise from activities on the subject site. Measurement locations are shown in Figure 3 below.



Figure 3: Unattended noise logger locations (Base image source: google maps)

During the measurement period, Stage 1 of the proposed activity was underway. A ‘quiet’ day with no manufacturing activities was agreed to with Ruru Homes on the 17<sup>th</sup> of December 2021. We understand that the Motueka Aerodrome and packing centre were both operational during this date. Additionally, there were no manufacturing activities on the 11<sup>th</sup>, 12<sup>th</sup>, 18<sup>th</sup> & 19<sup>th</sup> December 2021.

### 3.1 Motueka Aerodrome

Data regarding aircraft movements for Motueka Aerodrome have been provided by the Motueka Aerodrome Operator Manager via Ruru Homes to determine the contribution to the overall noise environment. Aerodrome operations are dependent on weather conditions and sunlight hours.

Prior to COVID-19, the aerodrome operations were consistent across the year with movements varying from 2,013 per month in December 2019 to 3,561 in November 2019. Table 1 summarises the monthly aircraft movements for 2019.

**Table 1: Motueka aircraft movements 2019**

Month (2019)	Aircraft Movements
January	2,714
February	2,511
March	2,828
April	3,192
May	3,176
June	2,113
July	2,264
August	2,423
September	2,109
October	2,538
November	3,561
December	2,013
<b>Average</b>	<b>2,620</b>

During the measurement period, aircraft movements for December 2021 were less than 990, which is significantly less than the average monthly aerodrome operations in 2019. We understand from the Client that Tasman District Council will accept our measured noise levels being adjusted to reflect aircraft movements from 2019. This is discussed further in Section 3.3.

Operational aircraft at the aerodrome are predominately single propellered light aeroplanes (93% of movements in December 2021). Helicopter movements accounted for approximately 4% of total movements in December 2021.

### 3.2 Fruit Packing Centre

A fruit cool store facility is located on the corner of Queen Victoria Street and Green Lane. Noise sources from this site include the car parking facilities, truck deliveries, site office and mechanical plant. The Golden Bay Fruit Coolstore Environmental Noise Impact Report<sup>1</sup> notes that the operational hours of the packing facility are Monday – Saturday with first shift commencing at 6.00am and last shift finishing at 1.00am the following day. No heavy vehicle deliveries or dispatch occur before 7.00am or after 8.00pm.

### 3.3 Unattended Noise Measurements

We deployed two noise loggers on the site. One was located close to the north-west boundary of the subject site. The other was located close to the south-west boundary of the subject site. The 15-minute time history sound levels for the measurement period 6 to 22 December 2021, as well as the logger locations, are displayed in Appendix B. The two logger locations are discussed below.

<sup>1</sup> Environmental Noise Impact Report Golden Bay Fruit Cool Store – Malcolm Hunt Associates December 2016



### 3.3.1 54 Green Lane North (MP1)

Over the measurement period, the noise climate at this location included birdsong, aircraft movements, noise from subject site activities (Stage 1) and distant traffic noise from vehicles on Queen Victoria Street.

We consider that this measurement location is representative of current noise environment for receivers 43 – 55 Queen Victoria Street.

Below summarises the measured and calculated average ambient noise level 2019 (dB  $L_{Aeq}$ ) and the measured background noise (dB  $L_{A90}$ ). The noise levels measured at MP1 over the five-day period where the proposed activity (Stage 1) was not active is included in Appendix B. Night-time noise levels have not been considered as the proposed activities would not occur during this period.

The main driver of the ambient noise levels is from aircraft taking off and landing at the aerodrome, with the background noise level controlled by other sound sources in the area.

As stated in Section 3.1 of this report, TDC have agreed that ambient noise levels can be adjusted to reflect flight movements from 2019. From the measurements, we have determined the average SEL ( $L_{AE}$ ) for an aircraft movement and calculated the ambient noise levels based on average monthly movements (refer Table 1) from 2019.

- Calculated average ambient noise level (calculated 2019) 58 dB  $L_{Aeq(Day)}$
- Weekday background noise level (measured 2021) 44 dB  $L_{A90(Day)}$
- Saturday background noise level (measured 2021) 41 dB  $L_{A90(Day)}$

It can be seen from Appendix B that aircraft movements approaching and departing Motueka aerodrome cause significant spikes in the measured sound levels. In addition, there is significant amount of variability in the day to day  $L_{Aeq}$  ambient noise levels due to the variation in day to day aerodrome operations. There is less variation in the average background noise levels ( $L_{A90}$ ) from day to day as the value of this data measure would not change with varying aerodrome operations.

### 3.3.2 54 Green Lane South (MP2)

Over the measurement period, the noise climate at MP2 was included birdsong, aircraft movements, noise from subject site activities (Stage 1), the fruit packing centre and traffic on Green Lane and Queen Victoria Street.

This measurement location is considered to be representative of current noise environment for receivers located at 63 & 65 Queen Victoria Street & 44, 45 & 47 Green Lane.

Below summarises the calculated operational ambient noise for 2019 aircraft movements (dB  $L_{Aeq}$ ) and the measured background noise (dB  $L_{A90}$ ). The noise levels measured at MP2 over the five-day period where the proposed activity (Stage 1) was not active is included in Appendix B. Night-time noise levels have not been considered as the proposed activities would not occur during this period.

- Calculated average ambient noise level (2019) 59 dB  $L_{Aeq(Day)}$
- Weekday background noise level (measured 2021) 45 dB  $L_{A90(Day)}$
- Saturday background noise level (measured 2021) 41 dB  $L_{A90(Day)}$

As at MP1, Appendix B shows the significant spikes in the measured sound levels due to aircraft movements and the variability in ambient noise level due to the day to day aerodrome operations. The higher background sound level is likely to be a result of the logger being closer to road traffic passing along Green Lane.

#### 4.0 NOISE PERFORMANCE STANDARDS

We have assessed the proposed light industrial activity as a discretionary activity as described in TRMP. There are no relevant noise rules for a discretionary activity within the TRMP, where the activity occurs within sites zoned Rural 1.

There is a general obligation in terms of Section 16 of the RMA which, in summary, states that an activity shall adopt the best practicable option (BPO) to ensure that the emission of noise does not exceed a reasonable level. In forming an opinion on what would constitute a “reasonable noise level” for an activity such as this, we consider the permitted activity noise criteria within the District Plan for areas zoned Rural 1 (rule 17.5.2.1(c)) to provide appropriate guideline criteria (See section 4.1).

The TRMP contains the following rule in relation to noise generated within a rural zone:

*17.5.2.1 (c) Except in the Richmond West Development Area, noise generated by the activity, when measured at or within the notional boundary of any dwelling in a Rural zone (other than any dwelling on the site from which the noise is being generated), Rural Residential, Papakainga or Tourist Services zone, or at or within any site within a Residential Zone, does not exceed:*

*Day:  $L_{eq}$  55 dB(A)*

*Night:  $L_{eq}$  40 dB(A) /  $L_{max}$  70 dB(A)*

**N.B.** *Day = 7am to 9pm Monday to Friday inclusive and 7am to 6pm Saturday*

*Night = all other times, plus public holidays*

*Noise must be measured and assessed in accordance with the provisions of NZS 6801:2008 Acoustics - Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise.*

The TRMP permitted activity noise limits is consistent with Section 8.6 of NZS 6802:2008<sup>2</sup> which sets out the recommended upper daytime noise limit of 55 dB  $L_{Aeq,15mins}$  for the reasonable protection of health and amenity associated with the use of land for residential purposes.

When considering what level of noise is reasonable from the activity, we have used the permitted activity noise limit as a guide. In addition, we have used the existing noise environment to form an opinion of the potential noise effects. This is discussed further in Section 6.0 of this report.

#### 5.0 PREDICTED NOISE LEVELS

The following sections set out the predicted noise levels, resulting from the proposed activity.

##### 5.1 Noise Prediction methodology

Operational noise has been predicted in general accordance with ISO 9613-2:1996<sup>3</sup> as implemented in SoundPLAN® environmental noise modelling software, taking into account the noise mitigation measures discussed in Section 2.3 of this report.

ISO 9613-2 considers a range of frequency dependent attenuation factors, including spherical propagation, atmospheric absorption, and ground absorption.

<sup>2</sup> Acoustics – Environmental noise

<sup>3</sup> ISO 9613-2:1996 “Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation”

## 5.2 Noise Rating Level

As per NZS 6802:2008, the rating level is to be used for comparison with a noise limit. The rating level allows for adjustment of a predicted or measured noise level to account for the character and duration of the noise.

NZS 6802:2008 Section 6.3.1 and Appendix B4 include a requirement to impose a +5 dB penalty for sounds which have ‘special audible characteristics’ (SAC), which attract attention much more readily than more “neutral” noise sources. Due to the nature of the proposed activity, we have applied a +5 dB penalty to the predicted noise levels.

## 5.3 Noise Emissions from Activities

To establish the noise emissions from the activity, we have implemented a combination of nearfield measurements of operational plant noise at the subject site, and comparable noise sources listed in BS:5228-1: 2009 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* Appendices C & D for construction activities.

Aspects of the typical site operations have been discussed with Ruru Homes<sup>4</sup> including percentage on-times for each plant item. Table 2 displays the anticipated plant items and associated percentage on-time during the prescribed daytime timeframe.

**Table 2: Proposed plant items and percentage on-time**

Equipment	Sound Power Level	% on-time
	(dB L <sub>WA</sub> )	Daytime (Monday – Saturday)
Impact driver	94	20%
Circular Saw (Framing station)	105	20%
Sander	89	20%
Forklift	84	10%
Nail Gun (framing station)	106	10%
Nail Gun (general - outside)	106	10%
Skilsaw	98	10%
Electric Hand planer	103	5%
Multitool	91	7.5%

For the purpose of this assessment, plant items have been located at the geometric centre of the Stages 1 and 2 areas (see Figure 2) with the exception of circular saw, grinder and the nailing gun (framing station) which are located in the framing station as shown in Figure 2. The predicted noise levels in Tables 3 & 4 are considered to be typical levels.

Where sources are located closer to the site boundary noise levels at the receiver may be higher for short durations. Similarly, where plant items are located further away from the geometric centre, noise levels would be lower than these typical levels. However, when sources are located closer to noise barriers, the acoustic performance of the barrier increases, providing additional mitigation.

<sup>4</sup> Email received from Ruru Homes 6<sup>th</sup> May 2021

### 5.3.1 Stage 1

The predicted noise levels resulting from vehicle movements and the construction activities, received at the notional boundary of the assessment locations, (see Figure 1) are summarised in Table 3.

**Table 3: Stage 1 predicted noise rating levels – with proposed mitigation**

Assessment location	Guideline Noise Limit L <sub>Aeq</sub> (dB)	Predicted noise level L <sub>Aeq</sub> (dB)	Predicted noise rating L <sub>r</sub> L <sub>Aeq</sub> (dB)
43 Queen Victoria Street	55	46	51
45 Queen Victoria Street	55	46	51
47 Queen Victoria Street	55	46	51
49 Queen Victoria Street	55	47	52
51 Queen Victoria Street	55	47	52
53 Queen Victoria Street	55	48	53
55 Queen Victoria Street	55	48	53
63 Queen Victoria Street	55	48	53
65 Queen Victoria Street	55	45	50
44 Green Lane	55	45	50
45 Green Lane	55	45	50
47 Green Lane	55	45	50

With the special audible character penalty, the proposed activity is complying with the guideline daytime noise limit for all receivers, during Stage 1 operations.

As the proposed activity has been identified as a discretionary activity, we have considered the impact to the affected receivers, by undertaking an assessment of noise effects (see Section 6.0).

### 5.3.2 Stage 2

We understand from communications with Ruru Homes<sup>5</sup> that manufacturing capacity of small homes would double during Stage 2. All manufacturing activities would remain outdoors.

For the purpose of this assessment, we have assumed that the same plant items listed in Table 2 would operate on the Stage 2 construction pads simultaneously to Stage 1, with circular saw, grinder and framing operations remaining within the allocated stations. This effectively doubles the number of plant items used on site.

The predicted noise levels resulting from vehicle movements and the proposed manufacturing activities, received at the notional boundary of the assessment locations (see Figure 1) are summarised in Table 4.

<sup>5</sup> Email received from Ruru Homes 6<sup>th</sup> May 2021

**Table 4: Stage 2 predicted noise rating levels – with proposed mitigation**

Assessment location	Guideline Noise Limit L <sub>Aeq</sub> (dB)	Predicted noise level L <sub>Aeq</sub> (dB)	Predicted noise rating L <sub>r</sub> L <sub>Aeq</sub> (dB)
43 Queen Victoria Street	55	47	52
45 Queen Victoria Street	55	47	52
47 Queen Victoria Street	55	47	52
49 Queen Victoria Street	55	48	53
51 Queen Victoria Street	55	49	54
53 Queen Victoria Street	55	49	54
55 Queen Victoria Street	55	50	55
63 Queen Victoria Street	55	50	55
65 Queen Victoria Street	55	47	52
44 Green Lane	55	47	52
45 Green Lane	55	47	52
47 Green Lane	55	46	51

With the special audible character penalty, the proposed activity is complying with the established guideline daytime noise limit for all receivers, during Stage 2 operations.

As the proposed activity has been identified as a discretionary activity, we have considered the impact to the affected receivers, by undertaking an assessment of noise effects (see Section 6.0).

## 6.0 ASSESSMENT OF NOISE EFFECTS

### 6.1 Comparison of activity noise with existing noise environment

As established in Section 5.0 of this report, the noise from the proposed activities is predicted to comply the 55 dB L<sub>Aeq</sub> established guideline noise limits for Stage 1 and Stage 2.

The existing noise environment provides a baseline for assessing noise effects. The effects can be assessed by quantifying the predicted noise levels from the proposed activity that surrounding residents would experience against the existing background noise level. The change in the noise environment can then be interpreted in relation to the subjective response of people and possible annoyance.

#### 6.1.1 Comparison with background noise level (L<sub>A90</sub>)

Noise sources contributing to the existing environment are set out in Section 3, along with measured and calculated noise levels for the existing environment in the absence of the activity. While the background noise level (L<sub>A90</sub>) reflects the underlying acoustic environment. The existing noise environment for the closest receivers is to a large extent, controlled by the aerodrome operations. The existing environment is determined to be non-pristine, with regular aircraft, road and light-industrial activities contributing to the overall noise level.

Table 5 summarises the predicted noise rating level from the proposed activity (Stages 1 and 2) and how it compares to the existing background noise levels during weekdays. Table 6 presents the same information for Saturdays.

**Table 5: Existing weekday background noise levels in the absence of site activities and predicted activity noise level (with mitigation as discussed)**

Assessment location	Existing background noise level (dB L <sub>A90,T</sub> )	Predicted activity rating noise level (L <sub>r</sub> ) above background noise level (dB)	
		Stage 1	Stage 2
43 Queen Victoria Street	44	7	8
45 Queen Victoria Street	44	7	8
47 Queen Victoria Street	44	7	8
49 Queen Victoria Street	44	8	9
51 Queen Victoria Street	44	8	10
53 Queen Victoria Street	44	9	10
55 Queen Victoria Street	44	9	11
63 Queen Victoria Street	45	8	10
65 Queen Victoria Street	45	5	7
44 Green Lane	45	5	7
45 Green Lane	45	5	7
47 Green Lane	45	5	6

**Table 6: Existing Saturday background noise levels in the absence of site activities and predicted activity noise level (with mitigation as discussed)**

Assessment location	Existing background noise level (dB L <sub>A90,T</sub> )	Predicted activity rating noise level above background noise level (dB)	
		Stage 1	Stage 2
43 Queen Victoria Street	41	10	11
45 Queen Victoria Street	41	10	11
47 Queen Victoria Street	41	10	11
49 Queen Victoria Street	41	11	12
51 Queen Victoria Street	41	11	13
53 Queen Victoria Street	41	12	13
55 Queen Victoria Street	41	12	14
63 Queen Victoria Street	41	12	14
65 Queen Victoria Street	41	9	11
44 Green Lane	41	9	11
45 Green Lane	41	9	11
47 Green Lane	41	9	10

Generally, as a guide, we consider the introduction of a noise source to be reasonable where noise levels from a proposed activity are no greater than 10 dB above the existing background noise level. However, this is not the only consideration when forming an opinion on whether the noise level generated by an activity is reasonable.

During weekdays, the noise level rating is generally within 10 dB of the background noise level (except for one assessment location where 11 dB is predicted). On Saturdays, the rating level is up to 14 dB above the background.

Although 14 dB exceeds this 10 dB guide, an exceedance of this magnitude often occurs in environments where there is a low background noise level, such is the case at this location. The absolute value in terms of the level of noise generated by an activity also needs to be considered. In our opinion, because the noise rating level of the activity noise is within the established guideline noise limit, the noise generated by the proposed activity remains reasonable.

As discussed in Section 3.1, a significant component of the existing noise environment is from the aerodrome. However, this noise source is variable and present when aircraft are taken off/landing. Therefore, noise from the proposed activity would be perceivable intermittently between aircraft take offs and landings. However, we consider the level of activity noise to be reasonable when compared to the existing background and ambient noise levels.

#### 6.1.2 Comparison with ambient noise level ( $L_{Aeq}$ )

As stated in Section 3.3 of this report, the average ambient noise level (for 2019 and potential future levels) is 58 to 59 dB  $L_{Aeq(15mins)}$  at our assessment locations.

The predicted activity noise level received at our assessment locations is 45 to 48 dB  $L_{Aeq(15mins)}$  during Stage 1 and 46 to 50 dB  $L_{Aeq(15mins)}$  during Stage 2. If we compare the existing ambient noise level with the proposed activity noise level, the average activity noise level is at least 8 dB lower than the ambient noise environment (based on 2019 flight movements) as summarised in Tables 7 and 8.

**Table 7: Change in ambient noise level due to introduction of the activity (Stage 1)**

Assessment location	Ambient noise level (2019), (dB $L_{A90,T}$ )	Predicted Stage 1 activity noise level (dB, $L_{Aeq}$ )	Predicted Cumulative Noise level (dB, $L_{Aeq}$ )	Predicted noise level increase, (dB)
43 Queen Victoria Street	58	46	58	0
45 Queen Victoria Street	58	46	58	0
47 Queen Victoria Street	58	46	58	0
49 Queen Victoria Street	58	47	58	0
51 Queen Victoria Street	58	47	58	0
53 Queen Victoria Street	58	48	58	0
55 Queen Victoria Street	58	48	58	0
63 Queen Victoria Street	59	48	59	0
65 Queen Victoria Street	59	45	59	0
44 Green Lane	59	45	59	0
45 Green Lane	59	45	59	0
47 Green Lane	59	45	59	0

**Table 8: Change in ambient noise level due to introduction of the activity (Stage 2)**

Assessment location	Ambient noise level (2019), (dB L <sub>A90,T</sub> )	Predicted Stage 2 activity noise level (dB, L <sub>Aeq</sub> )	Predicted Cumulative Noise level (dB, L <sub>Aeq</sub> )	Predicted noise level increase, (dB)
43 Queen Victoria Street	58	47	58	0
45 Queen Victoria Street	58	47	58	0
47 Queen Victoria Street	58	47	58	0
49 Queen Victoria Street	58	48	58	0
51 Queen Victoria Street	58	49	59	1
53 Queen Victoria Street	58	49	59	1
55 Queen Victoria Street	58	50	59	1
63 Queen Victoria Street	59	50	60	1
65 Queen Victoria Street	59	47	59	0
44 Green Lane	59	47	59	0
45 Green Lane	59	47	59	0
47 Green Lane	59	46	59	0

As shown Table 7 and Table 8, the cumulative average ambient noise level during the operational hours, is not predicted to increase by more than 1 dB at any location. A change in the ambient noise level of 1 dB is subjectively considered to be imperceptible to the average listener. However, as discussed, the proposed activity will at times, be audible between aircraft taking off and landing.

## 6.2 TRMP – Permitted Baseline

TRMP rule 17.5.2.1 (C) states that a permitted activity can generate a noise level of 55 dB L<sub>Aeq</sub> during the daytime (as prescribed by TRMP) at the notional boundary of any dwelling in a rural zone.

We have been informed<sup>6</sup> that under the TRMP rule 17.5.2.2 (b) a home occupation on this site would be permitted as of right, subject to compliance with the permitted activity rules. Activities occurring within a home occupation site, such as a workshop, which could include panel beating, vehicle repair or for instance woodworking or joinery, is permitted under this rule and can lawfully produce up to 55 dB L<sub>Aeq</sub> measured at the notional boundary of a residential building on a neighbouring property during working hours.

The types of noise produced by those particular home occupations would be comparable in character to the noise generated by the proposed activity. Based on this and our observation that with the proposed mitigation the current proposal would comply with the permitted activity noise limits, we consider that this rule would permit an activity with comparable noise effects.

## 6.3 Noise Effects Summary

There are many factors contributing to the existing ambient environment. The most significant of these is the aerodrome operations. As described in section 3.1.1 of this report, the aerodrome is active throughout the year, with movements anticipated to return to pre COVID-19 levels in the

<sup>6</sup> Email received from Hans Van Der Wal (Barrister) on 10<sup>th</sup> February 2022



forthcoming years. For this reason, we understand that TDC have accepted the approach of determining noise levels based on aircraft movements from 2019.

With frequent approaches/departures from the aerodrome, the noise levels from aircraft operations, received at nearby dwellings, frequently exceeds the noise generated from the proposed activity. An increase in flights would increase the ambient noise level in the area. However, there would not be an increase in the background noise level ( $L_{A90}$ ).

In our opinion, when considering the existing noise environment and the guideline noise limit established from the TRMP, we consider the activity noise generated to be reasonable, despite the activity noise being audible at the closest assessment locations between aircraft take offs and landings.

Measures to mitigate the adverse effects of the noise from the subject site would incorporate implementation of the best practicable option (BPO) to reduce the noise as much as practicable, including to less than the TRMP noise limit, where this can practicably be achieved. Implementation of measures to manage this noise would ensure that the subject site noise, while it may be audible, would be reasonable. To ensure that this is achieved, we recommend that a Noise Management Plan (NMP) is prepared by a suitably qualified person prior to the works commencing on the Site.

## 7.0 NOISE MANAGEMENT PLAN

The NMP should be implemented throughout the entire life of the site to manage noise levels.

The overarching approach of the NMP should align with Section 16 of the Resource Management Act (RMA) which, in summary, states that an activity shall adopt the best practicable option to ensure that the emission of noise does not exceed a reasonable level. This means that if it is practicably possible to reduce noise to even lower than the TRMP noise limit at any receiver, actions to achieve this should be implemented.

The NMP should include (but not be limited to) details regarding:

- Noise mitigation, including the bunding or barriers as discussed within this report;
- Limiting the hours of the construction activities to within the stated times and days;
- Maintenance and/or upgrading the site access route(s) and any other vehicle paths that are developed on the site to be kept free of undulations, potholes etc. to minimise truck noise;
- Minimising the banging of tailgates or other unnecessary truck noise;
- Ensuring that equipment is properly maintained;
- Avoidance of tonal reversing or warning alarms (suitable alternatives may include flashing lights, broadband audible alarms or reversing cameras inside vehicles).
- Mitigation measures (discussed above);
- Community liaison (providing contact details for complaints);
- Noise monitoring. This would include measurement of the production noise, received at selected representative receiver locations. Noise measurements would provide Ruru Homes Ltd with information regarding construction methodology; identify any processes that are unnecessarily noisy; provide confidence to potentially affected residents that their concerns are being considered; and identify compliance or non-compliance with the relevant noise limits; and
- Staff training.

## 8.0 RECCOMENDED RESOURCE CONSENT CONDITIONS

### *DRAFT CONDITION SET:*

1. *Noise generated by the activity, when measured at or within the notional boundary of any dwelling in a Rural zone (other than any dwelling on the site from which the noise is being generated), shall not exceed:*

- i. *Day: 55 dB  $L_{Aeq(15mins)}$*
- ii. *Night: 40 dB  $L_{Aeq(15mins)}$  /  $L_{AFmax}$  70 dB*

*N.B. Day = 7am to 9pm Monday to Friday inclusive and 7am to 6pm Saturday*

*Night = all other times, plus public holidays*

*Noise must be measured and assessed in accordance with the provisions of NZS 6801:2008 Acoustics - Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise.*

2. *Four weeks prior to the commencement of works on the Site, the consent holder shall provide to the Team Leader – Resource Consents, a Noise Management Plan. The Noise Management Plan shall be produced by a person suitably qualified and experienced in noise assessment and control and shall specify the mitigation measures to be undertaken to ensure that noise from the site, if measured anywhere within a notional boundary of a dwelling, either consented or established at the time of consent, shall not exceed 55 dB  $L_{Aeq(15 mins)}$  at all properties – 7am to 9pm Monday to Friday inclusive and 7am to 6pm Saturday*

*Noise levels shall be measured and assessed in accordance with NZS6802:2008 “Acoustics – Measurement of Environmental Sound” and NZS6802:2008 “Environmental Noise”.*

3. *Within six months of full operation, the consent holder shall monitor noise emissions from the site to assess compliance with the above condition. The survey locations shall be agreed between Council and the consent holder.*
4. *If noise emissions from the site do not exceed a maximum 55 dB  $L_{Aeq(15 mins)}$  at all properties – 7am to 9pm Monday to Friday inclusive and 7am to 6pm Saturday then no further action is required. If that standard is not met, then the consent holder shall:*
  - i. *Within four weeks of the date of the report and following consultation with the Team Leader - Resource Consents provide a revised Noise Management Plan specifying the further mitigation measures to be undertaken to ensure that noise from the site complies with the limits of Condition 2.*
  - ii. *Undertake the further mitigation measures specified within a further four weeks from the provision of the revised Noise Management Report.*
  - iii. *Within four weeks of undertaking those further mitigation measures, monitor noise emissions from the site to assess whether noise from the site would comply with the limits of Condition 2.*
  - iv. *If noise emissions from the site still exceed the limits of Condition 2, the process of this condition shall be repeated until that standard is met.*
5. *If within the first year the Council reasonably considers that the required standard cannot be met and gives the consent holder two months’ notice of its intention to do so, then it shall be entitled to give notice under s129 of the Act to review the conditions of consent to ensure that owners and occupiers of rural dwellings are not unreasonably affected by noise.*

## 9.0 CONCLUSION

The proposed activity is predicted to comply with our established guideline noise limits for during Stage 1 & 2 operations of the manufacturing facility.

Our opinion is that the noise effects of the mitigated operations, when compared with the noise environment in the area, are reasonable. This is despite the activity noise being distinguishable at times, due to the character of the sound and the variation in the ambient noise environment.

The predicted noise level due to the proposed activities are less than or equal to those that would occur as a result of a permitted activity compliant with the noise rules of the 55 dB  $L_{Aeq(15min)}$  TRMP.

We further note that the applicant has developed mitigation strategies to reduce noise levels. In our opinion, these mitigation measures satisfy the Resource Management Act requirement to adopt the BPO to ensure noise levels do not exceed a reasonable level.

To ensure that activity noise emissions are reasonable, we recommend that noise limits of the TRMP are adopted as the noise limits for the proposed activity.

**APPENDIX A GLOSSARY OF TERMINOLOGY**

<b>SPL or L<sub>p</sub></b>	<u>Sound Pressure Level</u> A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 µPa RMS) and expressed in decibels.
<b>SWL or L<sub>WA</sub></b>	<u>Sound Power Level</u> A logarithmic ratio of the acoustic power output of a source relative to 10 <sup>-12</sup> watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
<b>dB</b>	<u>Decibel</u> The unit of sound level.  Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 µPa i.e. $dB = 20 \times \log(P/Pr)$
<b>dB<sub>A</sub></b>	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
<b>A-weighting</b>	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
<b>L<sub>Aeq</sub></b>	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.
<b>L<sub>AFmax</sub></b>	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
<b>L<sub>A90</sub></b>	The A-weighted sound level exceeded for 90 % of the measurement period, measured in dB. Commonly referred to as the background noise level.
<b>L<sub>AE</sub></b>	Exposure Level. An A-weighted measure of the total sound energy over a certain time period, compressed into 1 second. Used to describe the sound energy of a single event, such as a train pass-by or an aircraft flyover.

## APPENDIX B UNATTENDED NOISE MEASUREMENTS

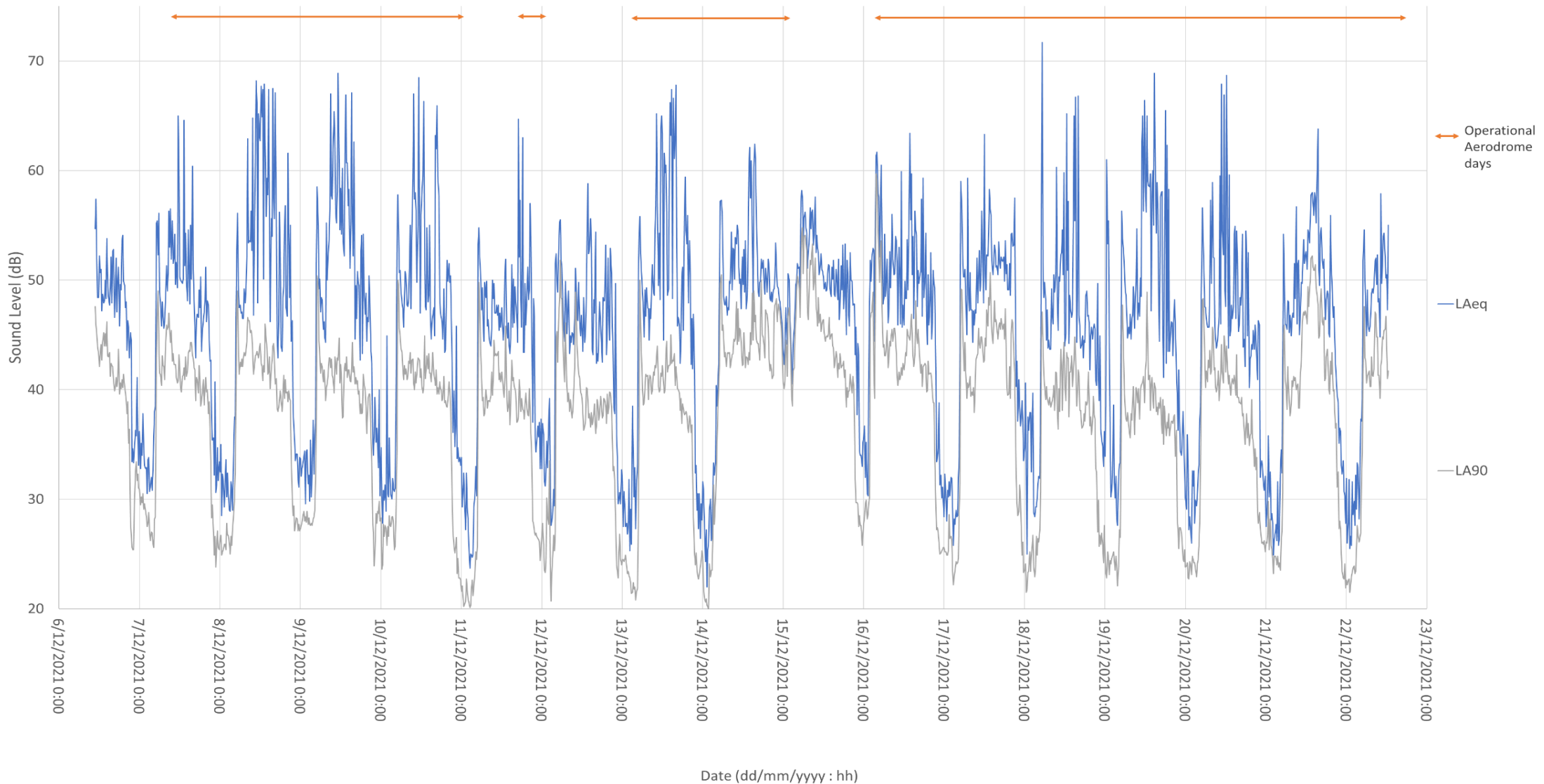
**Table B1: 54 Green Lane (MP1) Noise Level Measurements**

Measurement Daytime period <i>Day = 8am to 5pm Monday to Friday inclusive and 8am to 3pm Saturday</i>	Day	Average Ambient Noise Level dB LAeq(Day)	Ambient Noise Level range dB LAeq (15min)	Average Background Noise Level dB LA90(Day)
11 <sup>th</sup> December 2022	Saturday	47.0	43.3 – 51.9	40.8
12 <sup>th</sup> December 2022	Sunday	49.9	43.2 – 58.8	39.7
17 <sup>th</sup> December 2022	Friday	52.9	44.3 - 63.3	43.7
18 <sup>th</sup> December 2022	Saturday	56.0	43.7 – 65.2	40.7
19 <sup>th</sup> December 2022	Sunday	59.0	44.6 – 68.9	40.2

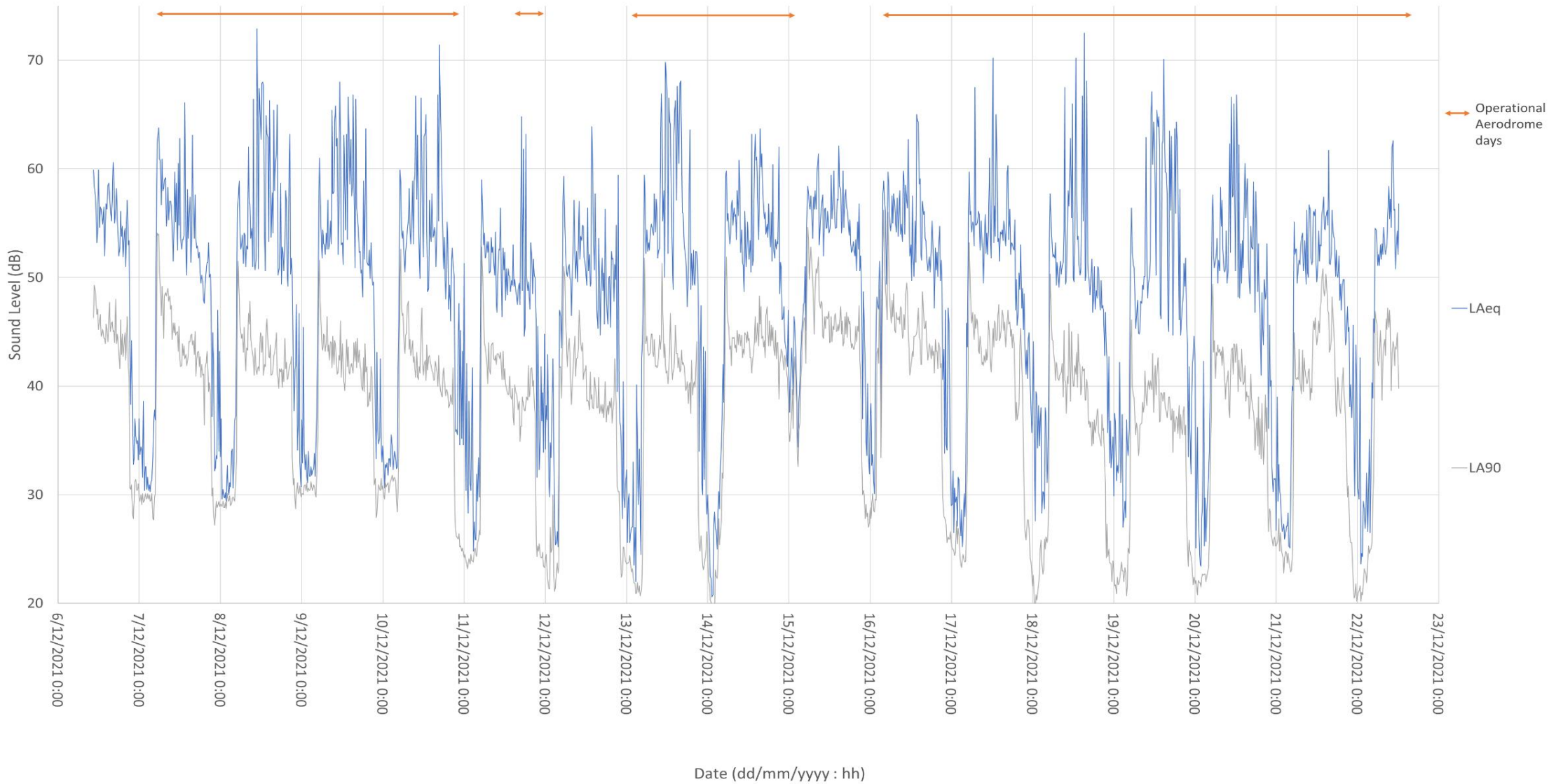
**Table B2: 54 Green Lane (MP2) Noise Level Measurements**

Measurement Daytime period <i>Day = 8am to 5pm Monday to Friday inclusive and 8am to 3pm Saturday</i>	Day	Average Ambient Noise Level dB LAeq(Day)	Ambient Noise Level range dB LAeq (15min)	Average Background Noise Level dB LA90(Day)
11 <sup>th</sup> December 2022	Saturday	51.4	46.4 - 56.4	40.7
12 <sup>th</sup> December 2022	Sunday	55.0	45.3 - 63.9	39.3
17 <sup>th</sup> December 2022	Friday	58.4	49.5 - 70.2	44.9
18 <sup>th</sup> December 2022	Saturday	60.7	49.4 - 70.2	41.0
19 <sup>th</sup> December 2022	Sunday	61.7	46.2 - 70.1	40.2

Unattended Noise Logger (MP1)



Unattended Noise Logger (MP2)



APPENDIX C PROPOSED ACTIVITY NOISE CONTOURS

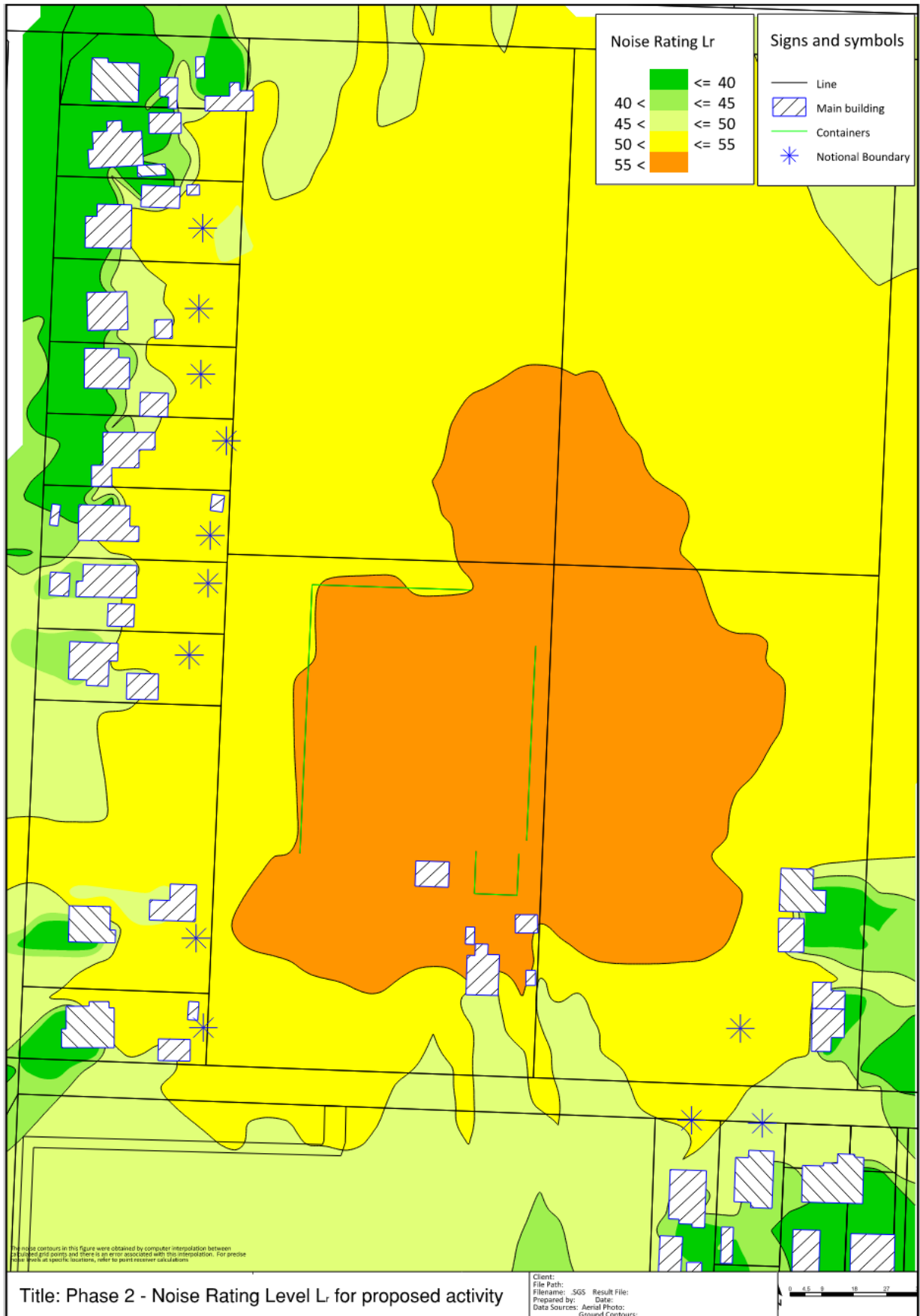


Figure C1: Stage 2 Noise Contours for proposed activity