

813-913 Wallgrove Road, Horsley Park

SSD Construction Noise and Vibration Management Plan

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Attention To	Gazbuild Pty Ltd

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TABLE OF CONTENTS

1	EXECUTIVE SUMMARY.....	5
2	INTRODUCTION	7
3	SITE DESCRIPTION AND NEAREST NOISE RECEIVERS.....	8
4	CONSTRUCTION HOURS	11
5	BACKGROUND NOISE LEVELS.....	11
5.1	RATING BACKGROUND NOISE LEVELS MEASURED FOR SSD-10330.....	16
5.2	SUMMARISED BACKGROUND NOISE LEVEL.....	16
6	NOISE MANAGEMENT LEVEL AND VIBRATION CRITERIA.....	16
6.1	REQUIREMENT BY DEVELOPMENT CONSENT	16
6.2	EPA – INTERIM CONSTRUCTION NOISE GUIDELINE.....	17
6.2.1	Airborne Noise Transmission for Residential Receivers.....	17
6.2.2	Airborne Noise Transmission for Industrial Receivers.....	18
6.3	AUSTRALIAN STANDARD 2436 “GUIDE TO NOISE CONTROL ON CONSTRUCTION MAINTENANCE AND DEMOLITION SITE”	18
6.4	SUMMARY OF APPLICABLE GUIDELINES	19
6.4.1	Summarised Noise Management Levels.....	19
6.5	VIBRATION	20
6.5.1	Assessing Amenity	21
6.5.2	Structure Borne Vibration.....	21
7	PRELIMINARY CONSTRUCTION NOISE EMISSION ASSESSMENT (STANDARD CONSTRUCTION HOURS)	22
7.1	PROPOSED SCOPE OF WORK DURING STANDARD CONSTRUCTION HOURS.....	22
7.2	PROGRAMME OF CONSTRUCTION WORK.....	22
7.3	PROPOSED STANDARD CONSTRUCTION HOURS OF WORK.....	24
7.4	REQUIREMENTS BY DA CONDITIONS	24
7.4.1	Condition C60 (d)	24
7.5	ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE SOURCES.....	25
7.6	PRELIMINARY NOISE ASSESSMENT DURING STANDARD CONSTRUCTION HOURS 25	
7.6.1	Methodology.....	25
7.6.2	Predicted Noise Levels.....	26
7.7	COMBINED PREDICTED CONSTRUCTION NOISE EMISSIONS	33
7.8	AMELIORATIVE MEASURES	33
7.8.1	Site Specific Recommendations.....	33
7.8.2	Noise Monitoring	34
7.9	GENERAL RECOMMENDATIONS	34
7.9.1	Silencing Devices	35
7.9.2	Material Handling.....	35
7.9.3	Treatment of Specific Equipment.....	35
7.9.4	Establishment of Site Practices.....	35
7.9.5	Community Consultation and Complaints Management.....	35
8	CONSTRUCTION VIBRATION ASSESSMENT (STANDARD CONSTRUCTION HOURS)	38
8.1	VIBRATION PRODUCING ACTIVITIES	38
8.2	REQUIREMENTS BY WATER NSW	38
8.3	PREDICTED VIBRATION LEVELS	39
8.4	FINDINGS.....	40
8.5	VIBRATION MONITORING.....	40

8.5.1 Downloading of Vibration Monitor Data..... 40

8.5.2 Presentation of Vibration Monitor Results 40

9 CONCLUSION..... 41

1 EXECUTIVE SUMMARY

Acoustic Logic has been engaged to prepare a construction noise and vibration management plan to support the masterplan development application submission during the construction stage of the industrial development proposed to be located at 813-913 Wallgrove Road, Horsley Park.

The proposed industrial development project site spans approximately 40 hectares of land with receivers surrounding the site being industrial with the nearest residential receivers located to the south of the site. The findings and recommendations are summarised below:

- No hydraulic hammering is required within the project site during BEW stage.
- Predicted vibration levels to NSW Warragamba to Prospect Pipeline are very low, additional mitigation measures beyond the broader report are not required.
- Predicted construction noise levels are generally lower than the Noise Management Levels based on NSW EPA Interim Construction Guidelines and fully satisfy requirements of Condition C62. As such, there are no Highly Affected Noise levels (≥ 75 dB(A)) that trigger additional noise mitigation/management measures in line with the NSW Interim Construction Noise Guideline (ICNG) and Condition C60 (e) & (f).

Summarised DA Condition and actions are below

Table 1 – Summary and Action for DA Conditions

Prior to the commencement of construction, the Applicant must prepare a Construction Noise Management Plan (CNMP) for the Development to the satisfaction of the Planning Secretary. The CNMP must form part of a CEMP required by Condition D2 and must:	Action
(a) be prepared by a suitably qualified and experienced noise expert whose appointment has been endorsed by the Planning Secretary;	George Wei (Author) has been approved by the Planning Secretary (refer letter dated 24 November 2022
(b) be approved by the Planning Secretary prior to the commencement of construction of each stage of the Development;	Outstanding
(c) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009) (as may be updated or replaced from time to time);	Noise management levels are achieved in accordance with the EPA's Interim Construction Noise Guideline (DECC, 2009) and the Operational Noise Limits outlined in Condition C62 of the Consent. Additional monitoring has been recommended during Construction to verify that the levels are achieved.
(d) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	the CNMP does not predict high noise generating works, and so no such strategies are necessary.
(e) include strategies that have been developed with the community for managing high noise generating works; and	the CNMP does not predict high noise generating works, and so no such strategies exist to consult with the community
(f) describe the community consultation undertaken to develop the strategies in (e); and	
(g) include a complaints management system that would be implemented for the duration of the Development.	A complaints management system is included in Section 7.9.5

2 INTRODUCTION

The potential noise and vibration generated from the construction of the industrial warehouse facilities will be assessed based on the requirements of the following:

- Condition C60 of Development Consent by NSW Government Department of Planning, Industry and Environment.
- NSW Environmental Protection Authority, *'Interim Construction Noise Guideline'*;
- Australian Standards AS2436:2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- NSW Environmental Protection Authority, *'Assessing Vibration: A technical Guideline'*; and
- DIN 4150, *'Vibration in Buildings (1999-02)'*.

The acoustic assessment is based on the architectural drawing DA-001(P3) dated 31 July 2020 provided by SBA Architects Project No. 20109. See Figure 1 below for an extract of the masterplan project site.

The principal issues, which will be addressed in this report, are:

- Identification of the noise and vibration standards which will be applicable to this project.
- Formulation of a strategy for construction to comply with the standards identified in the above point.
- Development of a monitoring programme to measure and regulate noise and vibration at all potentially affected locations.
- Establishment of direct communication networks between affected groups namely NSW Planning & Infrastructure, Construction group and Acoustic Logic Consultancy Pty Ltd.

3 SITE DESCRIPTION AND NEAREST NOISE RECEIVERS

The development land is located at 813-913 Wallgrove Road, Horsley Park and is bound between Wallgrove Road/M7 Motorway to the east and Reedy Creek to the west.

The nearest residential receivers are located south of the site with industrial receivers situated to the south and north, beyond the Sydney Water Supply Pipeline Easement. The nearest receivers are detailed below:

Receiver 1: Residential receivers located at 138, 142, 144 and 146 Burley Road, Horsley Park south of the project site. The distance between project site and the nearest receiver building is minimum 180m.

Receiver 2: Residential receivers located at 28, 34, 48, 50, 58-64 and 56-104 Burley Road, Horsley Park south of the project site. The distance between project site and the nearest receiver building is minimum 270m.

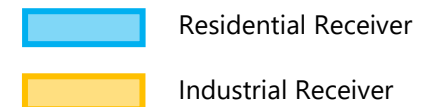
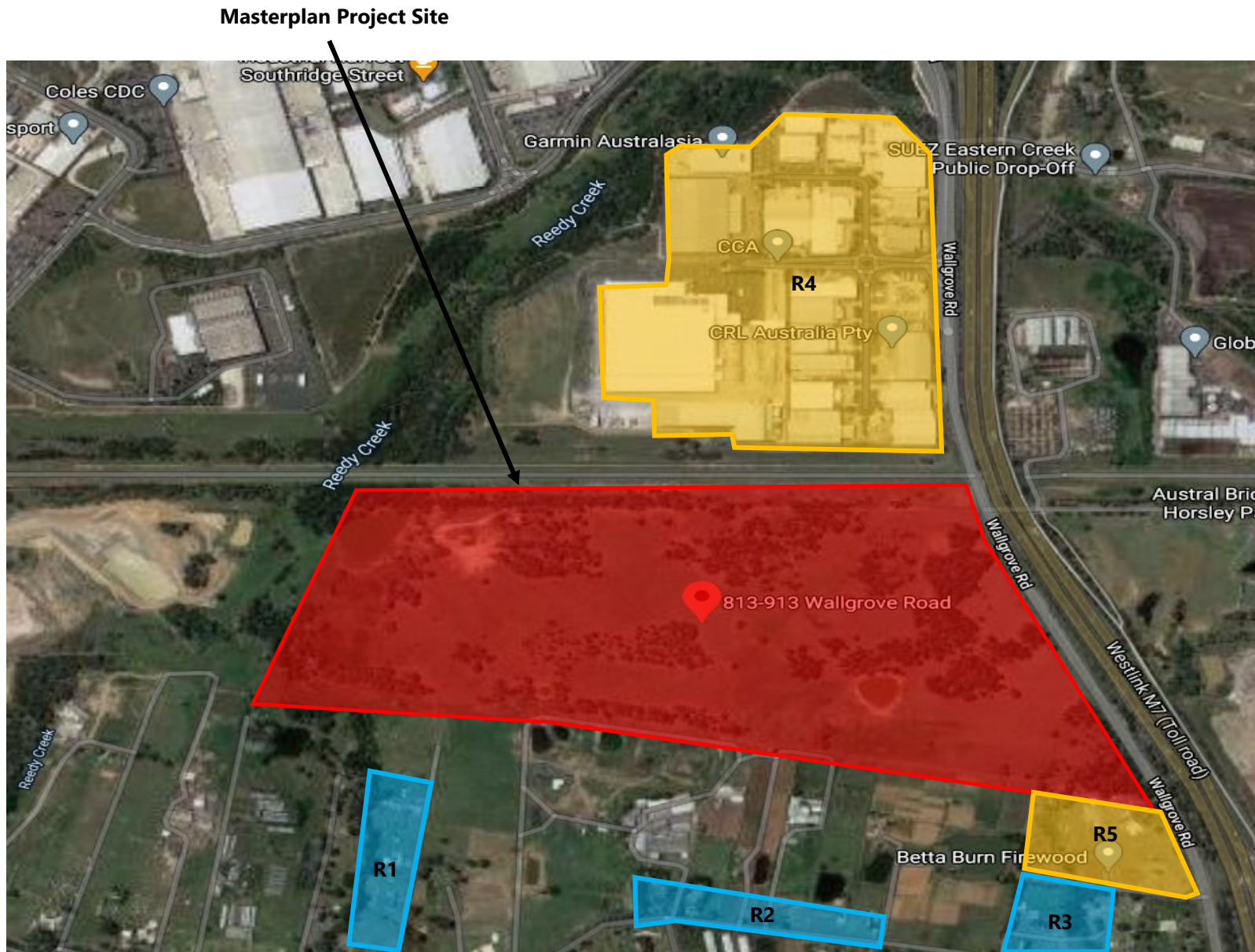
Receiver 3: Residential receivers located at 2A, 2B & 2C Burley Road, Horsley Park south of the project site. The distance between project site and the nearest receiver building is minimum 200m and separated by commercial building of Receiver 5.

Receiver 4: Industrial receivers located at 1-21 Shale Place and 1-14 Clay Place, Horsley Park north of the project site.

Receiver 5: Industrial receiver located at 785-811 Wallgrove Road, Horsley Park south of the project site.

See Figure 2 below for an aerial photo of the project site, nearest receivers and the noise measurement locations.





4 CONSTRUCTION HOURS

Section 2.2 of the EPA Interim Construction Noise Guideline lists the recommended standard hours of construction, which are detailed below:

- 7:00 am to 6:00 pm, Mondays to Fridays.
- 8:00 am to 1:00 pm, Saturdays.
- No work on Sundays and public holidays.

Works may be undertaken outside these hours where:

- The delivery of material is required outside the hours by the police or other authorities.
- It is required in an emergency to avoid the loss of life, damage to property and/or to prevent environmental harm.
- The work is approved through this Construction Noise and Vibration Plan.

5 BACKGROUND NOISE LEVELS

Unattended noise monitoring was conducted recently by using Rion NL-42 (Type 2) sound level meters.

The monitoring was continuous, with statistical noise levels recorded at 15-minute intervals throughout the monitoring period. Measurements were taken on "A" frequency weighting and fast time response.

All monitoring equipment used retains current calibration - either manufacturers' calibration or NATA certified calibration. The monitors were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

The monitoring locations are shown in Figure 3.

Ambient, assessment and rating background levels have been determined from the long term, unattended noise monitoring data based on the methodology in the Noise Policy for Industry Fact Sheet B. Appendix 1 contains graphs of the data collected, including periods identified as being affected by adverse weather conditions (as defined by INP Fact Sheet B).

Weather data was obtained from records provided by the Bureau of Meteorology for the weather station located at Horsley Park Equestrian Centre.

Detailed monitor locations are presented below:



Figure 3 - Logging Locations

The NPfl day time periods are:

- Day - period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays

The following tables summarise the assessment background noise levels (ABL) for each location. Where no ABL is indicated, that period was affected by adverse weather or other extraneous noise and excluded from the ABL calculation.

Table 2 – NPfl Assessment Background Noise Levels Location 1

Location	Date	ABL
		Day
L1	Thursday 13 January 2022	-
	Friday 14 January 2022	41
	Saturday 15 January 2022	40
	Sunday 16 January 2022	40
	Monday 17 January 2022	42
	Tuesday 18 January 2022	-
	Wednesday 19 January 2022	-
	Thursday 20 January 2022	-
	Friday 21 January 2022	42
	Saturday 22 January 2022	41
	Sunday 23 January 2022	39
	Monday 24 January 2022	39
	Tuesday 25 January 2022	41
	Wednesday 26 January 2022	-
	RBL	40

Table 3 – NPfl Assessment Background Noise Levels Location 2

Location	Date	ABL
		Day
L2	Thursday 13 January 2022	-
	Friday 14 January 2022	42
	Saturday 15 January 2022	40
	Sunday 16 January 2022	39
	Monday 17 January 2022	41
	Tuesday 18 January 2022	-
	Wednesday 19 January 2022	-
	Thursday 20 January 2022	-
	Friday 21 January 2022	45
	Saturday 22 January 2022	44
	Sunday 23 January 2022	41
	Monday 24 January 2022	40
	Tuesday 25 January 2022	42
	Wednesday 26 January 2022	39
	Thursday 27 January 2022	42
	Friday 28 January 2022	43
	Saturday 29 January 2022	40
	Sunday 30 January 2022	40
	Monday 31 January 2022	40
	Tuesday 01 February 2022	40
	Wednesday 02 February 2022	-
	Thursday 03 February 2022	44
	RBL	40

Table 4 – NPfl Assessment Background Noise Levels Location 3

Location	Date	ABL
		Day
L3	Thursday 13 January 2022	-
	Friday 14 January 2022	48
	Saturday 15 January 2022	44
	Sunday 16 January 2022	42
	Monday 17 January 2022	46
	Tuesday 18 January 2022	-
	Wednesday 19 January 2022	-
	Thursday 20 January 2022	-
	Friday 21 January 2022	51
	Saturday 22 January 2022	48
	Sunday 23 January 2022	44
	Monday 24 January 2022	47
	Tuesday 25 January 2022	52
	Wednesday 26 January 2022	43
	Thursday 27 January 2022	52
	Friday 28 January 2022	50
	Saturday 29 January 2022	47
	Sunday 30 January 2022	46
	Monday 31 January 2022	46
	Tuesday 01 February 2022	43
	Wednesday 02 February 2022	-
	Thursday 03 February 2022	48
	Friday 04 February 2022	-
	RBL	46

5.1 RATING BACKGROUND NOISE LEVELS MEASURED FOR SSD-10330

Further to the discussion of existing ambient profile, the following RBL data obtained by SLR Consultants at 106 Burley Road, Horsley Park is detailed within DPIE's comments pertaining to the Consent Modification for the Gazcorp Industrial Estate (Ref: SSD-5248 MOD 1).

Table 5 –Rating Background Noise Levels Measured by SLR Consultants at 106 Burley Road (Ref: SSD-5248 MOD 1)

Time Period	Rating Background Noise Level dB(A)L ₉₀
Day	38

As the above rating background noise levels are lower than the results of the RBL recorded by this office for the development, the above Rating Background Noise Levels have been adopted for the purposes of assessing Noise Management Level of the residential receivers south of the project site.

5.2 SUMMARISED BACKGROUND NOISE LEVEL

The following table summarises the rating background noise levels determined for the daytime periods as defined in the NPfl.

Table 6 – NPfl Rating Background Noise Levels

Location	Rating Background Noise Level (dB(A) L ₉₀)
	Day
Receiver 1	40
Receiver 2	40
Receiver 3	46
106 Burley Road	38

6 NOISE MANAGEMENT LEVEL AND VIBRATION CRITERIA

6.1 REQUIREMENT BY DEVELOPMENT CONSENT

The following requirements have been detailed in Development Consent by NSW Government Department of Planning, Industry and Environment:

- C60. Prior to the commencement of construction, the Applicant must prepare a Construction Noise Management Plan (CNMP) for the Development to the satisfaction of the Planning Secretary. The CNMP must form part of a CEMP required by Condition D2 and must:
- (a) be prepared by a suitably qualified and experienced noise expert whose appointment has been endorsed by the Planning Secretary;
 - (b) be approved by the Planning Secretary prior to the commencement of construction of each stage of the Development;
 - (c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009) (as may be updated or replaced from time to time);
 - (d) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;
 - (e) include strategies that have been developed with the community for managing high noise generating works; and
 - (f) describe the community consultation undertaken to develop the strategies in (e); and
 - (g) include a complaints management system that would be implemented for the duration of the Development.

6.2 EPA – INTERIM CONSTRUCTION NOISE GUIDELINE

The Interim Construction Noise Guideline (ICNG) outlines that the transmission of noise generated by various construction/excavation activities will primarily occur via two paths:

- Airborne Noise.
- Ground-borne Noise.

As the nearby residential receivers are a minimum 300m away from the boundary of the site, ground-borne noise as a result of vibration transmitted through the ground into the structure, is unlikely to occur.

6.2.1 Airborne Noise Transmission for Residential Receivers

Table 2 of the Interim Construction Noise Guideline outlines the management levels for noise at residences depending on the hours of construction.

- *"Noise affected" level.* Where construction noise is predicted to exceed the "noise affected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise affected level". For residential properties, the "noise affected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)_{Leq(15min)}.
- *"Highly noise affected level".* Where noise emissions are such that nearby properties are "highly noise affected", noise controls such as respite periods should be considered. For residential properties, the "highly noise affected" level occurs when construction noise exceeds 75dB(A)_{Leq(15min)} at nearby residences.

The noise management levels are outlined in the table below.

Table 7 – Noise Management Levels for Residential Receivers

Time of Day	Management Level dB(A) $L_{eq(15mins)}$
Recommended standard hours: Monday to Friday (7am – 6pm); Saturdays (8am – 1pm) and no works on Sunday or public holidays	Noise affected RBL* + 10dB(A) = 48
	Highly noise affected level = 75

* The lowest RBL or rating background level is the overall single figure background noise levels measured during the assessment period at the affected receiver boundary.

6.2.2 Airborne Noise Transmission for Industrial Receivers

This guideline also outlines the noise emission management levels from the construction site to industrial receivers.

“4.1.3 Commercial and industrial premises

Due to broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into three categories. The external noise levels should be assessed at the most affected occupied point of the premises:

- *Industrial premises: external $L_{Aeq(15min)}$ 75dB(A)*
- *Offices, retail outlets: external $L_{Aeq(15min)}$ 70dB(A)*
- *Other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.*

The proponent should assess construction noise levels for the project and consult with occupants of commercial and industrial premises prior to lodging an application where required.

During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work.”

6.3 AUSTRALIAN STANDARD 2436 “GUIDE TO NOISE CONTROL ON CONSTRUCTION MAINTENANCE AND DEMOLITION SITE”

Where compliance with EPA requirements cannot be achieved, noise emissions must be managed in accordance with the principles outlined in AS 2436:

- A reasonable suitable noise criterion is established.
- All practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes on parts of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours.
- The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the building site.

6.4 SUMMARY OF APPLICABLE GUIDELINES

Based on these guidelines, the following procedure will be used to assess noise emissions:

- For industrial receivers surrounding the subject site, a noise level of 75 dB(A) is allowed during recommended standard hours.
- For residential receivers surrounding the subject site, a noise level of 10 dB(A) above background level at these receivers is allowed during recommended standard hours with a highly noise affected management level of 75dB(A)_{Leq(15-min)}.
- If noise levels exceed the project specific noise management level at sensitive receiver locations, investigate and implement all practical and cost-effective techniques to limit noise emissions.
- If the noise management levels are still exceeded after applying all practical engineering controls to limit noise emissions investigate management controls and other techniques to mitigate noise emissions.

6.4.1 Summarised Noise Management Levels

The summarised noise management levels for the proposed excavation and construction activities are presented in the table below.

Table 8 – Summarised Noise Management Levels

Noise Receiver Location	Management Level dB(A) _{Leq (15 min)}
Residential Receivers (Receiver 1 to Receiver 3)	<u>Recommended Standard Hours</u> "Noise Affected" Level - 48 "Highly Noise Affected" Level – 75
Industrial Receivers (Receiver 4 & 5)	75

6.5 VIBRATION

Vibration caused by construction at any residence or structure outside the subject site must comply with the following standards:

- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*; and
- For human exposure to vibration, the evaluation criteria presented in EPA NSW "Assessing Vibration: A Technical Guideline" (Feb 2006). The EPA guideline is based on the British Standard BS 6472:1992 *Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)* for low probability of adverse comment.

The criteria and the application of this standard are discussed in separate sections below.

Table 9 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

6.5.1 Assessing Amenity

EPA NSW "Assessing Vibration: A Technical Guideline" (Feb 2006) is based on the guidelines contained in BS 6472:1992. This guideline provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings.

The recommendations of this guideline should be adopted to assess and regulate vibration within the excavation/construction site.

Table 10 – EPA Recommended Vibration Criteria

		RMS acceleration (m/s ²)		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	Time	Preferred	Maximum	Preferred	Maximum	Preferred	Maximum
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices		0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices		0.64	1.28	13.0	26.0	18.0	36.0
Workshops		0.64	1.28	13.0	26.0	18.0	36.0

6.5.2 Structure Borne Vibration

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 2.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

7 PRELIMINARY CONSTRUCTION NOISE EMISSION ASSESSMENT (STANDARD CONSTRUCTION HOURS)

7.1 PROPOSED SCOPE OF WORK DURING STANDARD CONSTRUCTION HOURS

The proposed scope of work to be undertaken is detailed as follows:

- clearing of vegetation and undertaking bulk earthworks (BEW) across the entire site
- construction of internal estate roads, water, sewer, telecommunications and gas infrastructure\
- construction of estate landscaping

The above works will be undertaken over a 12 - 14 month programme.

7.3 PROPOSED STANDARD CONSTRUCTION HOURS OF WORK

The above scope of work is proposed to be undertaken during the following standard construction hour periods:

Monday to Friday: 7:00am to 6:00pm;

Saturday: 8:00am to 1:00pm; and

Sunday/Public Holidays: No Works.

See Figure 2 for a detailed location where the construction works are to be undertaken and the nearest surrounding receivers to the project site.

7.4 REQUIREMENTS BY DA CONDITIONS

7.4.1 Condition C60 (d)

Describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers

This office has been advised that **No Hydraulic Hammering** is required within the project site for the construction of the project buildings.

Our review indicates that the major noise source during excavation and construction work are detailed below:

- 2 x 30 Ton Excavators with Bucket Attachments.
- 4 x Concrete Pumps.
- 4 x Concrete Trucks.
- 4 x Diesel Mobile Cranes.
- 4 x Semi-Trailers
- Compactor
- Grader
- Scraper
- 2×Bobcat
- Drum Roller
- 3×Lump Hammer
- Water Cart
- 4×Forklift
- 4×Welders

7.5 ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE SOURCES

Preliminary noise impacts have been undertaken based on the assumed typical worst-case scenario and associated Sound Power Level noise data is detailed below:

Table 11 – Sound Power Levels of the Proposed Equipment

EQUIPMENT / PROCESS	SOUND POWER LEVEL dB(A)
Concrete Pump	105
Concrete Truck	105
Excavator with Bucket Attachment	105
Diesel Mobile Crane	105
Semi-Trailer	105
Compactor	98
Grader	99
Scraper	102
Bobcat	104
Drum Roller	104
Lump Hammer	105
Water Cart	107
Forklift	97
Welders	101

The noise levels presented in the above table are derived from the following sources, namely:

- On site measurements;
- Table A1 of Australian Standard 2436-2010 & Table A1 of Australian Standard 2436-2010; and
- Data held by this office from other similar studies.

7.6 PRELIMINARY NOISE ASSESSMENT DURING STANDARD CONSTRUCTION HOURS

7.6.1 Methodology

Noise from the loudest typical construction activities have been predicted to the nearest most affected sensitive receivers. The predicted noise levels are presented in this section and are based on the areas on site in which the plant is likely to be used.

Where the position of the construction activity is variable, a range of predicted noise levels is presented to take into account the change in noise impact depending on where on the site the work is conducted.

Predictions take into account:

- The distance between the noise source and the receiver; and
- The screening effect provided by barriers or building structures (where relevant).

7.6.2 Predicted Noise Levels

SoundPLAN noise modelling has been undertaken based on the assumed construction methodology and activities likely to be undertaken simultaneously at the project site and therefore resulting in the '*worst-case*' scenario.

The SoundPLAN noise modelling presents the cumulative predicted external noise levels to the nearest surrounding receivers. In addition, see the tables below for the predicted noise level range.

SOUND PLAN MODEL 1 - OVERALL SITE PLAN

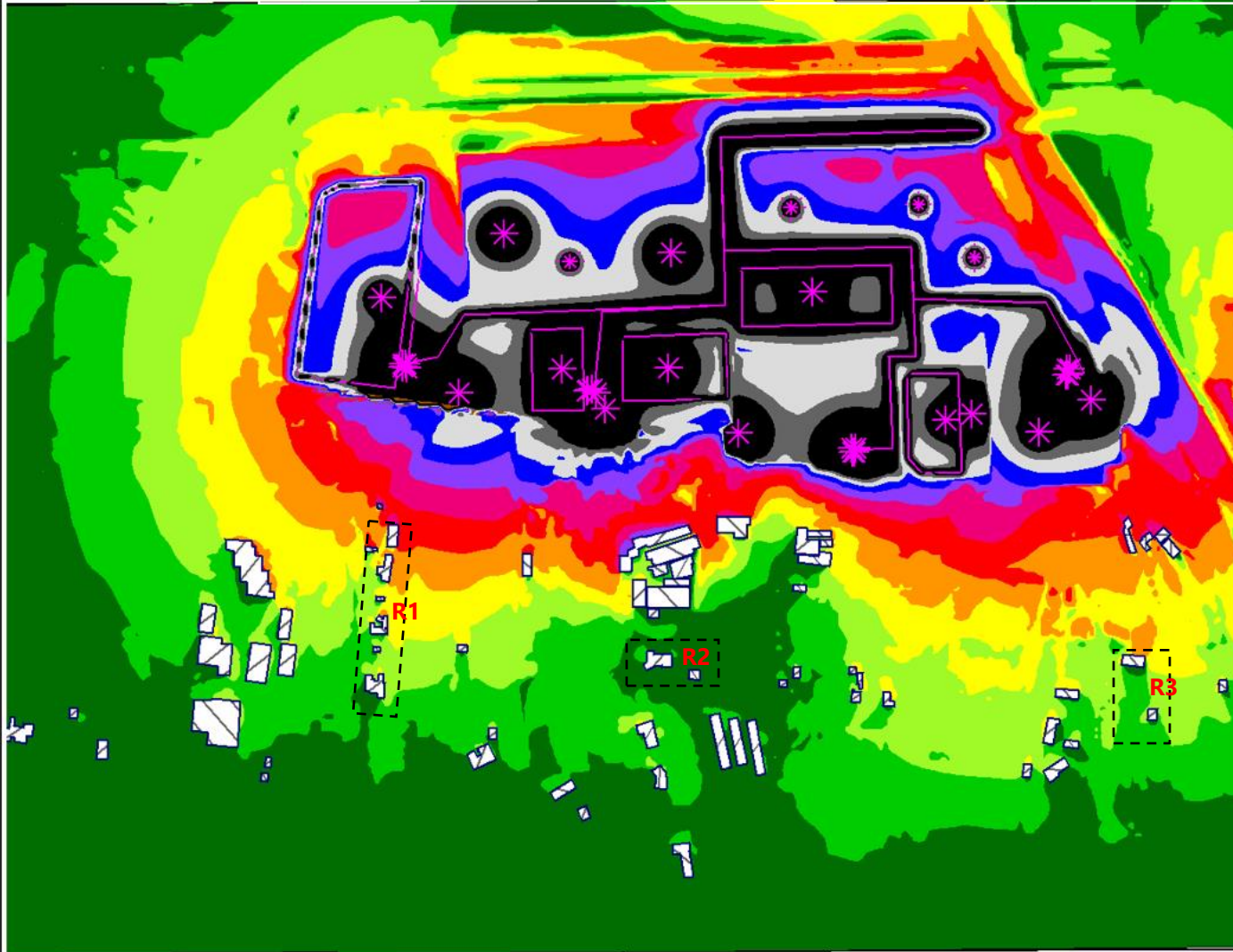
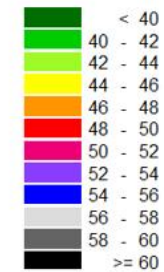
**Momentum Industrial
Estate - 813-913 Wallgrove
Road, Horsley Park**

Construction Noise

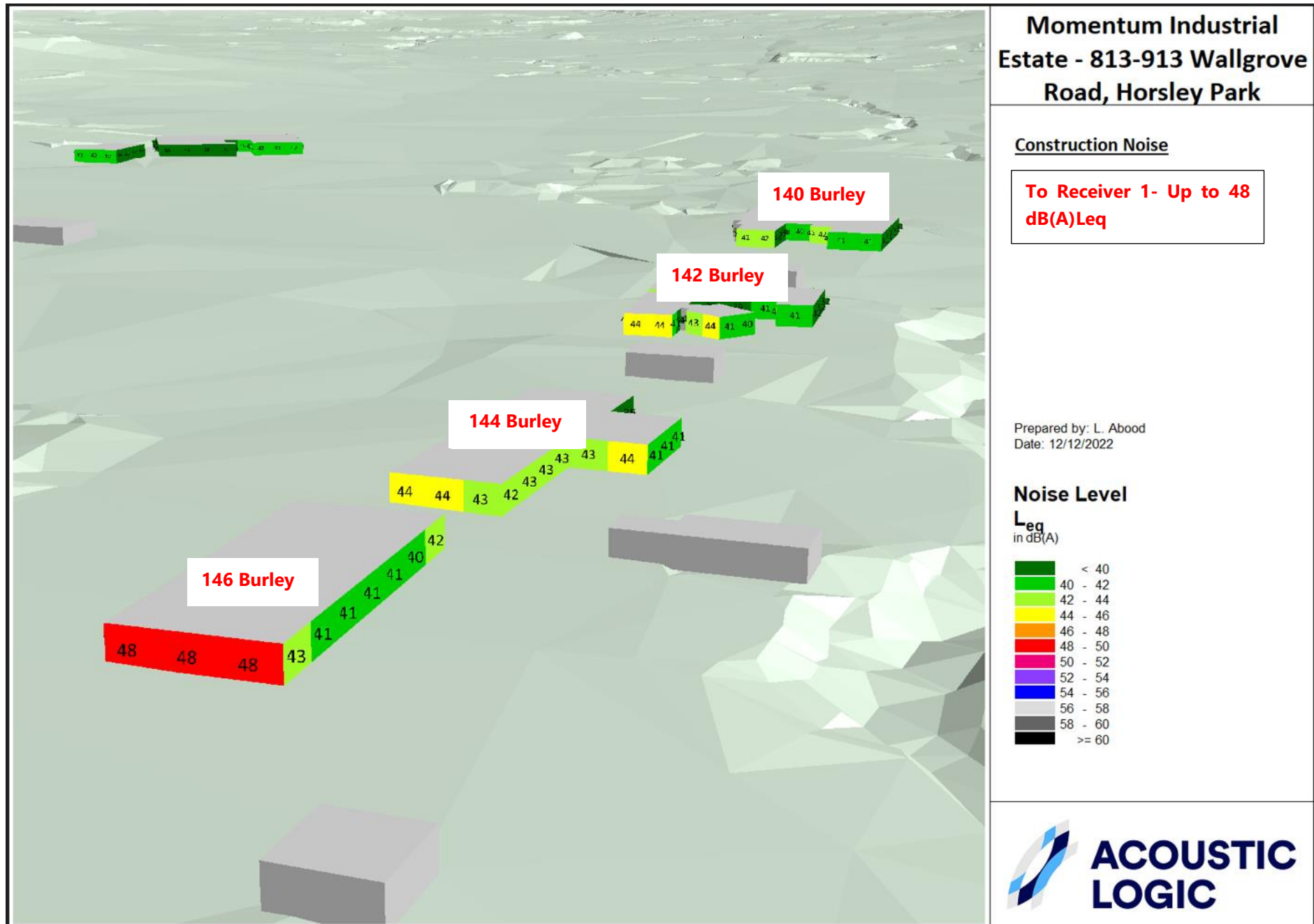
Prepared by: L. Abood
Date: 12/12/2022

Noise Level

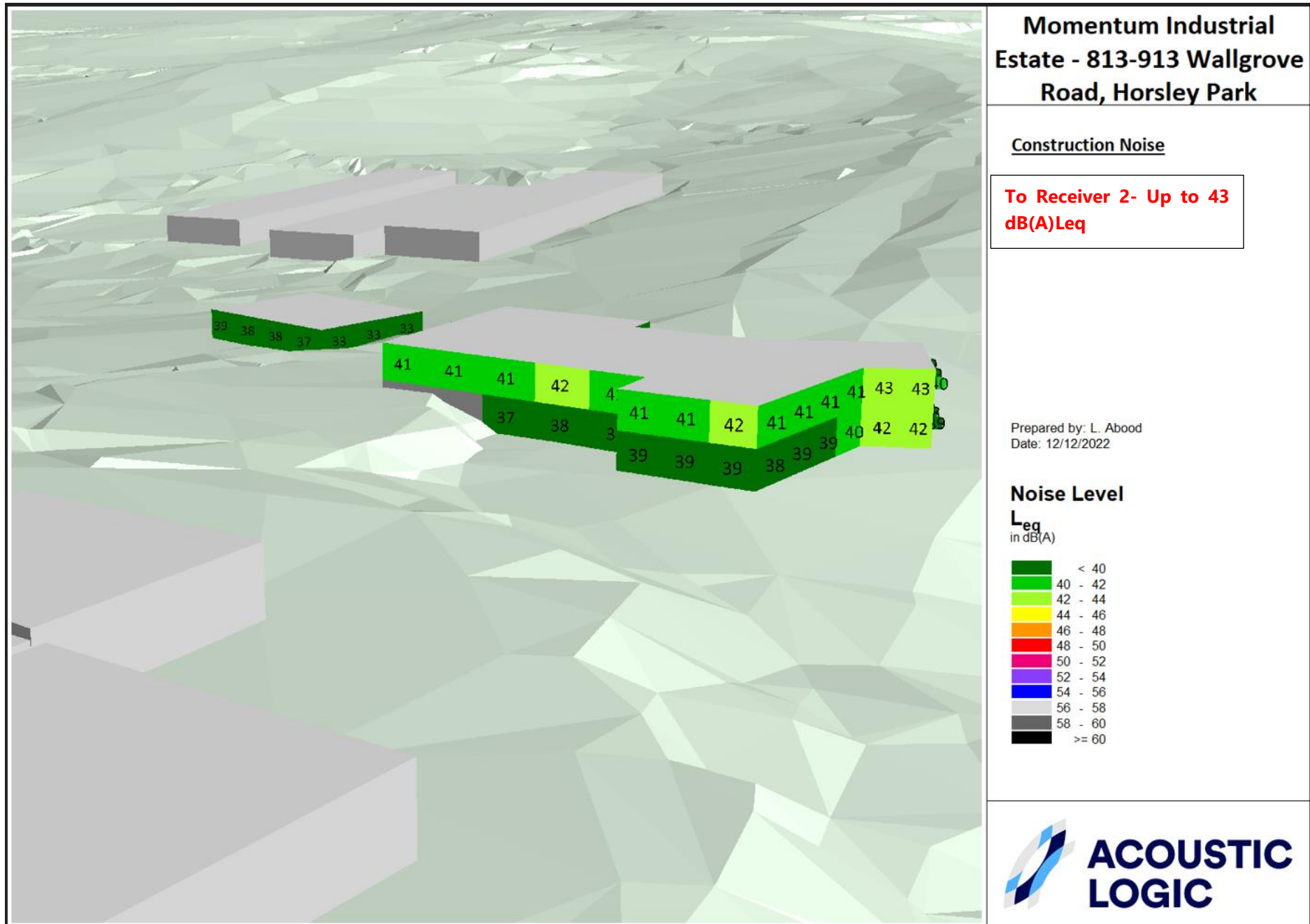
L_{eq}
in dB(A)



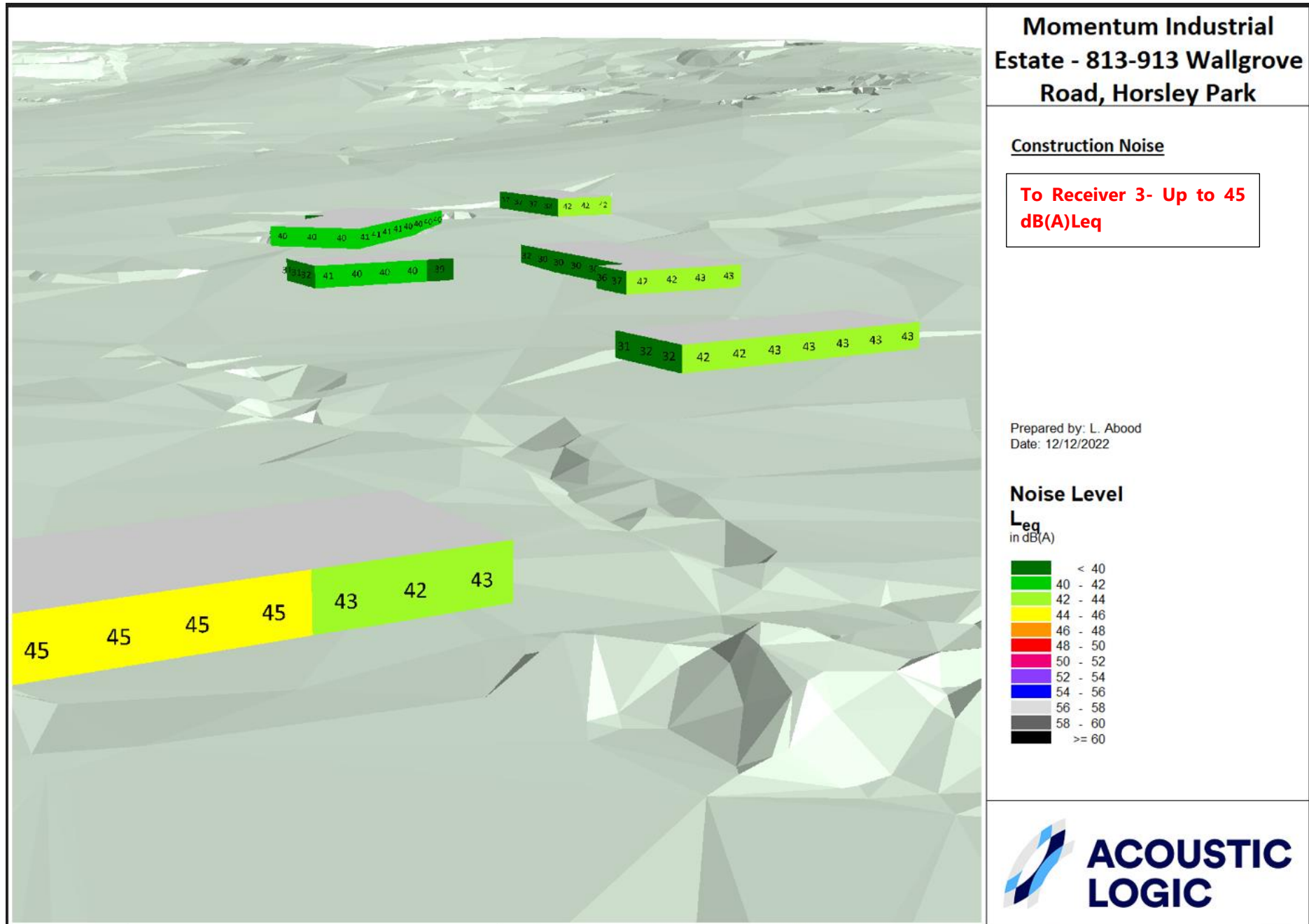
SOUND PLAN MODEL 2 - SENSITIVE RECIEVER 1



SOUND PLAN MODEL 3 - SENSITIVE RECIEVER 2



SOUND PLAN MODEL 4 - SENSITIVE RECIEVER 3



SOUND PLAN MODEL 5 - SENSITIVE RECIEVER 4

**Momentum Industrial
Estate - 813-913 Wallgrove
Road, Horsley Park**

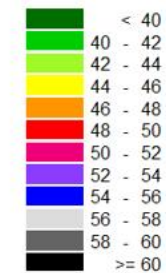
Construction Noise

**To Receiver 4- Up to 48
dB(A)Leq**

Prepared by: L. Abood
Date: 12/12/2022

Noise Level

L_{eq}
in dB(A)



SOUND PLAN MODEL 6 - SENSITIVE RECIEVER 5

Momentum Industrial Estate - 813-913 Wallgrove Road, Horsley Park

Construction Noise

**To Receiver 5- Up to 50
dB(A)Leq**

Prepared by: L. Abood
Date: 12/12/2022

Noise Level

L_{eq}
in dB(A)

	< 40
	40 - 42
	42 - 44
	44 - 46
	46 - 48
	48 - 50
	50 - 52
	52 - 54
	54 - 56
	56 - 58
	58 - 60
	>= 60



7.7 COMBINED PREDICTED CONSTRUCTION NOISE EMISSIONS

The predicted construction noise emissions from construction activities being undertaken within the project site as presented in section 7.6 of this report are detailed in the table below.

Table 12 – Combined Predicted Construction Noise Levels

Worst Case Noise Receiver	Time of Day	Predicted Noise Level dB(A) L_{eq} 15 min	Noise Management Level dB(A) L_{eq} 15 min	Comply ?
Receiver 1	Recommended standard hours: Monday to Friday (7am – 6pm) Saturdays (8am – 1pm)	Up to 48	"Noise Affected" Level - 48 "Highly Noise Affected" Level – 75	Yes
Receiver 2		Up to 43		Yes
Receiver 3		Up to 45		Yes
Receiver 4		Up to 48	75	Yes
Receiver 5		Up to 50	75	Yes

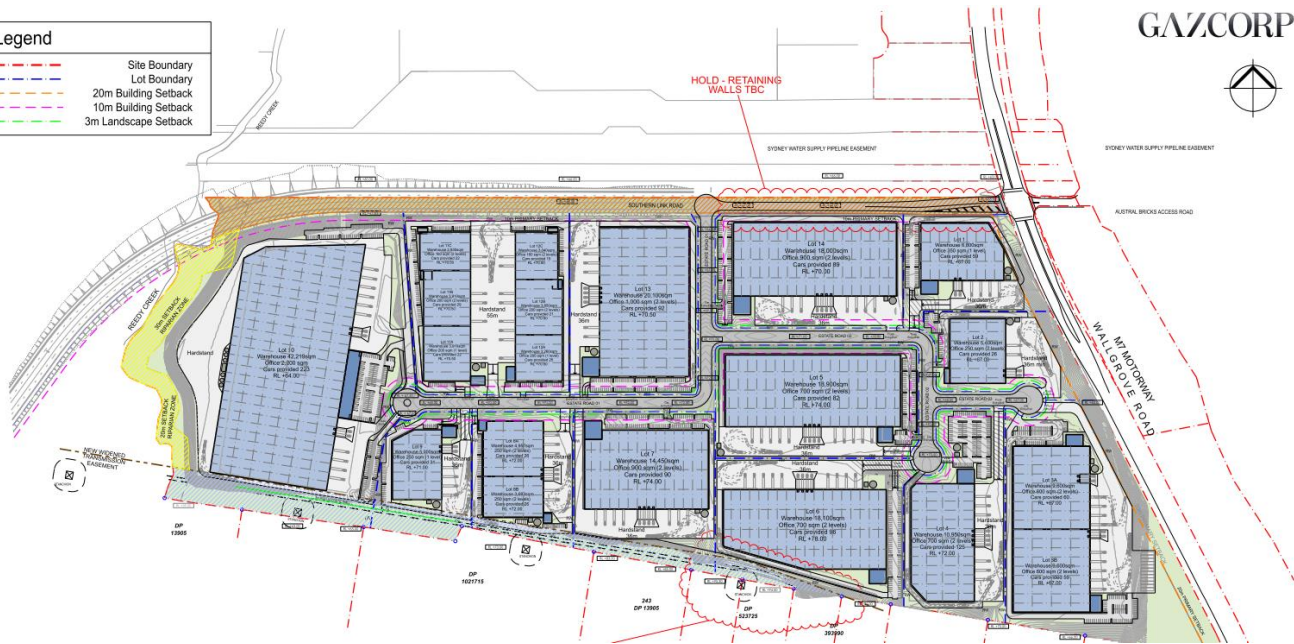
7.8 AMELIORATIVE MEASURES

7.8.1 Site Specific Recommendations

Detailed site-specific recommendations to mitigate noise and vibration impacts on surrounding receivers are detailed below. These controls should be reviewed once a contractor is appointed, and the construction methodology is finalised.

- No hydraulic hammering is allowed within the project site.
- Although the Construction noise generated is within the acceptable guidelines, a 3m high acoustic barrier will be established in accordance with Condition C63 of the SSD 5248 Consent. It is noted that the Sound Plan modelling in this report does not include the boundary fencing.

Legend	
	Site Boundary
	Lot Boundary
	20m Building Setback
	10m Building Setback
	3m Landscape Setback



- Majority of excavation is to be done using Bull Dozers with Scrapers.
- Stationed equipment shall be located as far as possible from residences as practicable and are to be screened by an enclosure.
- Vehicle Noise:
 - Truck movements should not commence prior to 7am.
 - Trucks must turn off their engines during idling to reduce impacts on nearby residential receivers (unless truck ignition needs to remain on during concrete pumping).
 - Avoid careless dropping of construction materials into empty trucks.
- Equipment shall be well maintained.

Hand tools would only be typically used sporadically. Additionally, we recommend the following controls:

- After verified complaint, the use of hand-held jackhammers, grinders, and electric saws should be screened from surrounding receiver locations with localised acoustic barriers such as an Eco Barrier or plywood hoarding fixed to temporary fencing.

7.8.2 Noise Monitoring

Long term and short-term noise monitoring programmes are recommended to support the noise management systems of the construction work.

- Minimum two real time noise monitors should be setup along southern boundary of the project site. Detailed monitor locations should follow the major construction machines. It is recommended to carryout 1-week ambient noise monitoring before commencement of the construction work. The real time noise monitors are with camera to record the major picture of noise source if possible. Noise exceedance will be studied, and management action will be followed once the alarm message is received.
- The monitoring report should be provided every fortnight to summarise the findings.

7.9 GENERAL RECOMMENDATIONS

General noise management practices which may be adopted are discussed below. In addition, notification, reporting and complaints handling procedures should be adopted as recommended in section in this report.

7.9.1 Silencing Devices

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

7.9.2 Material Handling

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

7.9.3 Treatment of Specific Equipment

In certain cases, it may be possible to specially treat a piece of equipment to reduce the sound levels emitted. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

7.9.4 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. This includes locating fixed plant items as far as possible from residents as well as rotating plant and equipment to provide respite to receivers.

Construction vehicles accessing the site should not queue in residential streets and should only use the designated construction vehicle routes. Loading of these vehicles should occur as far as possible from any sensitive receiver.

7.9.5 Community Consultation and Complaints Management

DA Condition C60 requires below:

- (e) *include strategies that have been developed with the community for managing high noise generating works, and*
- (f) *describe the community consultation undertaken to develop the strategies in (e) and*
- (g) *include a complaints management system that would be implemented for the duration of the Development.*

Noise modelling indicates that the noise generated by construction activities to residential receivers will satisfy the Noise Management Level based on NSW EPA Interim Construction Noise Guideline and significantly lower than the Highly Affected Noise Level 75 dB(A). Strategies for managing high noise generating works in accordance with the NDW EPA Interim Construction Noise Guidelines are not required. However, the following procedures are recommended for handling noise complaint.

Real time noise monitoring data should be checked immediately after receiving complaint and determine the major noise source /activities based on the recorded noise level and pictures.

7.9.5.1 Performance Objective

- To ensure that all environmental complaints in relation to the noise and vibration from the Stage 1 construction activities are promptly and effectively received, handled and addressed.

7.9.5.2 Responsibility

- The Communications and Community Liaison Representative is responsible for ensuring that the appropriate management response and handling procedures are instigated and carried through in the event of an environmental complaint. It should be ensured that all site employees are aware of and understand their obligations for complaints response.

- All employees who take receipt of a complaint, either verbal or written, are to immediately notify the Contractor's Project Manager, who will then contact the Communications and Community Liaison Representative.

7.9.5.3 Complaints Handling Procedure

- Upon becoming aware of a complaint, the protocol outlined below will be followed.

7.9.5.4 Record and Acknowledge

- Any employee who take receipt of a complaint, either verbal or written, is to immediately notify the Contractor's Project Manager who will then contact the Communications and Community Liaison Representative. The Contractor's Project Manager will be available 24 hours a day, seven days a week and have the authority to stop or direct works.
- In the normal course of events, the first contact for complaints will usually be made in person or by telephone.
- The complainant's name, address and contact details, along with the nature of the complaint, must be requested. If the complainant refuses to supply the requested information, a note will be made on the form and complainant advised of this.

7.9.5.5 Assess and Prioritise

- The Communications and Community Liaison Representative will prioritise all complaints by considering the seriousness of the complaint including risk to health and safety and will attempt to provide an immediate response via phone or email.

7.9.5.6 Investigate

- A field investigation will be initiated in an attempt to confirm details relevant to the complaint and the cause of the problem. Any monitoring information and/or site records at and around the time of the complaint will be reviewed for any abnormality or incident that may have resulted in the complaint.

7.9.5.7 Action or Rectify

- Once the cause of the complaint has been established, every possible effort will be made to undertake appropriate action to rectify the cause of the complaint and mitigate any further impact. The Communications and Community Liaison Representative will assess whether the complaint is founded or unfounded and delegate the remediation of the issue to the Contractor's Project Manager for action, as required.
- As outlined in Section above, if a complaint regarding acoustic impacts is concluded to be substantiated, the need for any changes to the acoustic mitigation measures identified for the Project in Section 7 and/or the noise/vibration monitoring programme is to be reviewed.

7.9.5.8 Respond to Complainant

- The Communications and Community Liaison Representative and the Contract Superintendent will oversee the rectification of the issue. The Communications and Community Liaison representative will then respond to the complainant once the issue has been resolved. The complainant will be provided with a follow up verbal response on what action is proposed within 24 hours. Where a complaint cannot be resolved by the initial or follow-up verbal response, a written response will be provided to the complainant within ten days.

7.9.5.9 Record

- It is imperative that an investigation of the situation is carried out and proposed improvements documented in order to minimise the potential for similar complaints in the future. On this basis, every complaint received is to be recorded in the Complaint Enquiry Form. A copy of the completed form will be maintained for at least five years. The complaint will also be recorded in the Complaints Register.

7.9.5.10 Preventative Action

Once the complaint has been suitably handled, proposed improvements will be investigated and implemented to minimise the potential of re-occurrence. The Complaint Enquiry Form will not be closed out until the preventative actions are completed and recorded on the form.

7.9.5.11 Complaints Register

Procedures of complaints management have been detailed in CEMP prepared for this project.

- A Complaints Register will be maintained during construction and will contain the following:
 - A copy of the environmental complaint handling procedure;
 - A separate reference sheet containing the contact details;
 - Blank hard copies of the Complaint Enquiry Form; and
- Copies of all completed Complaint Enquiry Forms, which are to be maintained for at least five years after the event to which they relate.

8 CONSTRUCTION VIBRATION ASSESSMENT (STANDARD CONSTRUCTION HOURS)

8.1 VIBRATION PRODUCING ACTIVITIES

Proposed activities that have the potential to produce significant ground vibration include:

- Excavation Work; and
- Construction Work.

8.2 REQUIREMENTS BY WATER NSW

Condition C101

Condition C101 requires confirmation from a Geotechnical Engineer that the proposed construction would not adversely affect the integrity of the Pipelines or stability of the embankments within the pipeline corridor.

Further Analysis of impact to Warragamba To Prospect Pipe Corridor

Consideration Water NSW *Guideline for Developments Adjacent to the Upper Canal and Warragamba Pipelines (GDAUCWP) 2021* taking in to account the potential effects of the development.

Location of Pipelines in proximity to Site

The pipelines are approximately 40 – 50 metres from the Site boundary.

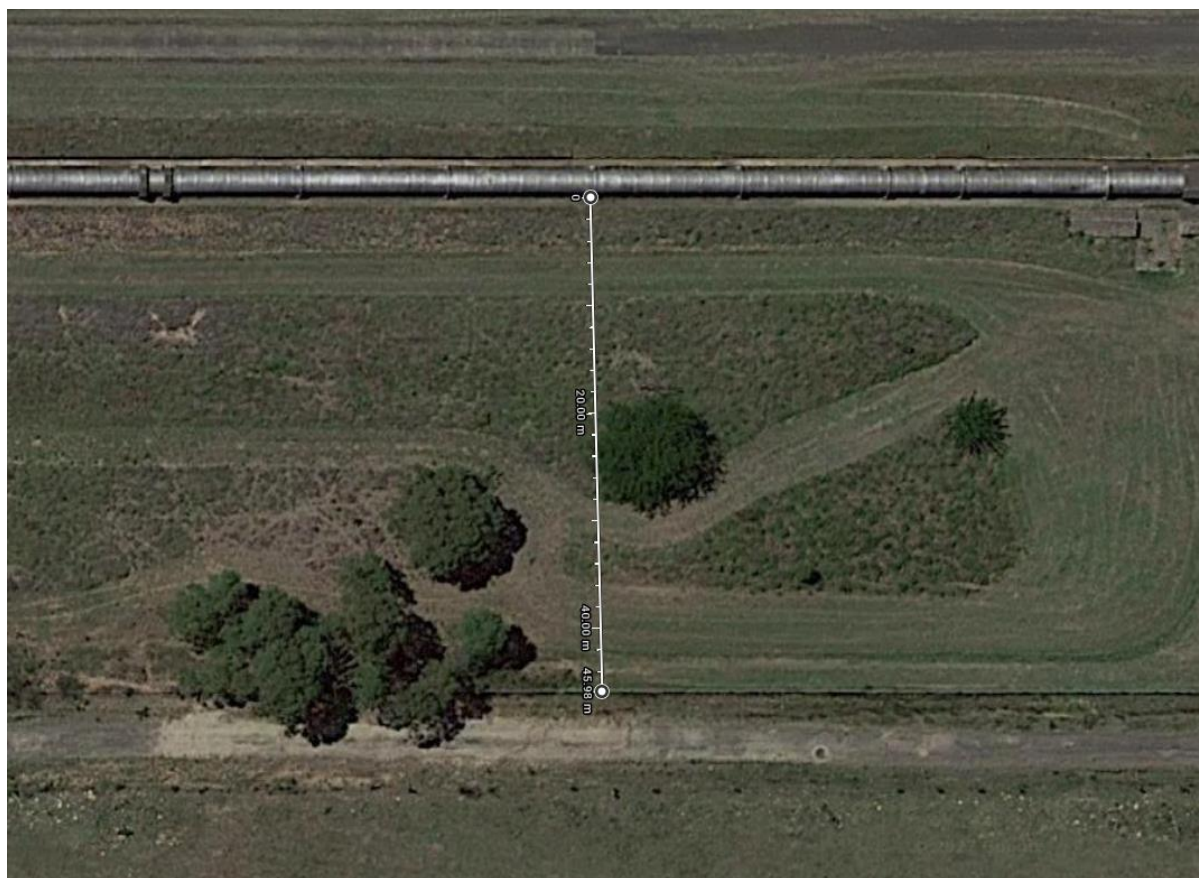


Table 13 – Vibration Criteria

Factor to be considered		Application to SSD 5248
Excavation	No excavation is to be made within a five-metre buffer of the water supply infrastructure without prior engineering analysis of the structural stability and effects excavation accepted by WaterNSW	No excavation works associated with SSD 5248 Consent are proposed within 5 metres of the water supply infrastructure. This criterion is not applicable.
Vibration	The German Standard DIN 4150-3:2016 Structural Vibration Part 3: Effects of Vibration in Structures should be used to assess vibration effects.	Refer to Predicted vibration levels

8.3 PREDICTED VIBRATION LEVELS

Although no excavation works are proposed in the vicinity of the boundary (the area is predominantly fill) we have considered a 14T Vibratory Roller and Excavator Hammering (not proposed) for potential impact the construction works may have to the pipelines. The provides a worst-case analysis for consideration.

Plant/Equipment	PPV (mm/s) at distance from source						WaterNSW GDAUCWP/ German Standard DIN 4150-3:2016 Criteria (mm/s)
	5m	10m	15m	20m	30m	40m	Warragamba Pipelines
14T Vibratory Roller ¹	9.4	4.0	2.0	1.1	0.3	0.1	3mm/s 1-10 Hz 3-8 mm/s 10-50 Hz 8-10 mm/s 50-100 Hz
Excavator Hammering ²	–	6	3.0	1.6	0.5	0.1	

1. EMS measured a 14 Tonne Vibratory Roller for the M5 East Cooks River Substation Access Road (Report No.: EMS19 6381), EMS assumes similar vibration emissions from the 13.3T Padfoot Roller and 11.5 Smooth Drum Roller.
2. Based on the measurement given in the RTA *Environmental Noise Management Manual* (ENMM) 2001 of an excavator hammering at 10m metres with Peak Particle Velocity of 6 mm/s.
3. EMS notes when using the British Standard for impacts to residences, it is important that the criteria are reduced by 50% to account for resonances in structures due to prolonged vibration activities (to avoid structural damage to buildings). The frequency of vibration from the vibratory rollers is assumed to be above 15 Hz whilst the excavator/hammering is assumed to be between 1 and 100 Hz.

8.4 FINDINGS

The proposed works with the SSD 5258 MOD 1 consent are not anticipated to cause elevated vibration levels that will require specific mitigation measures beyond what is anticipated in the broader report.

Further to above, we note Gazcorp has been in consultation with Water NSW regarding the works associated with SSD 5248. It has entered into a Construction Licence Deed (as executed on 15 November 2022) to undertake the works. Below is a non-exhaustive list of requirements:

- Undertaking of Dilapidation Surveys of the pipelines to the satisfaction of Water NSW,
- Relevant Insurance policies in place.
- Bank Guarantees for the performance of the Licence Deed

A letter to commence construction was received from Water NSW on 29 November 2022.

8.5 VIBRATION MONITORING

The predicted vibration levels are significantly lower than the criteria specified by Water NSW. It is recommended to install a vibration monitor on site at location on surface level close to the Warragamba Dam Pipeline before commencement of excavation work. The monitor should be with SMS system to send alarm message once the measured vibration exceeds the trigger level (recommended alarm trigger level of 2.5mm/s PPV).

8.5.1 Downloading of Vibration Monitor Data

Downloading of the vibration monitor data will be conducted on a regular basis. In the event of exceedance of the vibration criteria, downloading of the vibration monitor data will be conducted more frequently. Results obtained from the vibration monitor will be presented in a graph format and will be forwarded to the client for review. It is proposed that reports are provided fortnightly with any exceedances in the vibration criteria reported as detailed in this report.

8.5.2 Presentation of Vibration Monitor Results

A fortnightly report will be submitted to the client via email summarising the vibration events. The vibration exceedance of criteria is recorded, and the report shall be submitted within 24 hours. Complete results of the continuous vibration logging will be presented in fortnight reports including graphs of the collected data.

9 CONCLUSION

Acoustic Logic has prepared a construction noise and vibration management plan to support the masterplan development application submission during the construction stage of the industrial development proposed to be located at 813-913 Wallgrove Road, Horsley Park.

- No hydraulic hammering is allowed within the project site during construction stage.
- Predicted vibration levels to NSW Warragamba to Prospect Pipeline are low, real time vibration monitoring is recommended to ensure that the Water NSW Pipes are safeguarded during construction work.
- Predicted construction noise levels are generally lower than the Noise Management Levels recommended by NSW EPA Interim Construction Guidelines. Real time noise monitoring programmes are recommended to mitigate the noise impact to residential receivers

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,



Acoustic Logic Consultancy Pty Ltd
George Wei
Director, MAAS

NSW Fair Trading Approved Building and Development Certifier – Acoustic (Registration No: BDC04838)