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Atkins Acoustics and Associates Pty Ltd.
Consulting Acoustical & Vibration Engineers

NOISE & VIBRATION ASSESSMENT
DEMOLITION, EARTHWORKS & CONSTRUCTION
YENNORA DISTRIBUTION CENTRE
LOFTUS STREET. GUILDFORD

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Rev 00

Prepared for: Stockland
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1.0 INTRODUCTION

Atkins Acoustics was engaged by Stockland to conduct a construction noise and vibration assessment (CNVA) for the demolition, earthworks and construction works associated with the redevelopment of Building 3 and the construction of Building 8A on the north western portion of the Yennora Distribution Centre *(Attachment 1).*

The project involves the development of two (2) industrial buildings, associated offices, heavy vehicle hardstand and carparking.

The proposed form of construction is typical for industrial projects and comprises:

- high level concrete pad and strip footings
- concrete floor slab
- concrete wall panels (low level) with steel cladding (high level)
- steel portal frame structure with metal roof cladding
- concrete hardstand
- concrete and/or asphalt carparks
- landscaping

The aim of the CNVA is:

- establish site specific construction noise and vibration management levels;
- identify residential receivers likely to be affected by noise and vibration from the envisaged construction works;
- review typical activities associated with the proposed site works;
- predict and assess the likely range of noise and vibration levels emitted from the envisaged site activities; and
- where identified review typical noise and vibration management/mitigation options to ameliorate impacts.

The information presented in this report has been prepared for the particular investigation described herein, and should not be used in any other context or for any other purpose without the written approval of *Atkins Acoustics* and *Stockland*.

2.0 SPECIFIC ENVIRONMENTAL NOISE and VIBRATION CONDITIONS

The site specific construction noise and vibration management levels referenced in the site Consent Conditions are summarised in the Tables 1 and 2, below.

2.1 Construction Hours

8. All construction work associated with the development shall be carried out between 7.00am and 6.00pm Monday to Friday, or between 8.00am and 1.00pm on Saturdays.

9. No construction work shall be carried out on Sundays or public holidays.

10. Notwithstanding Condition 8 above, the Applicant may carry out construction work outside the specified construction hours:

    (a) With the written approval of the Director-General, provided she is satisfied that the proposed works would not adversely affect the amenity of the surrounding area, or if she is satisfied that the proposed works would require continuous construction;

    (b) If the police (or any other authority) requires the delivery of goods outside the specified hours for safety reasons;

    (c) In an emergency where people or equipment is in danger, provided the Applicant notifies the Council and the Department immediately, and explains the reasons for extending the specified construction hours, and the likely duration of the proposed variation.

2.2 Construction Noise Criteria

11. During these construction works, the Applicant shall comply with the following construction noise criteria.

Table 1. Construction Noise Management Levels

Length of Construction Period	Construction Noise Criteria dB(A)		
	Location 1 69 Dennistoun Avenue	Location 2 29 Dennistoun Avenue	Location 3 64 Byron Road
Rating Background Level (RBL	43	43	43
4 weeks and under	63	63	63
> 4 weeks but not >26 weeks	53	53	53
> 26 weeks	48	48	48

2.3 Construction Vibration Criteria

12. During these construction works, the Applicant shall comply with the following construction vibration criteria:

Table 2. Construction Vibration Management Levels

Place	Time	Intermittent or Impulsive mm/sec
Residential	Daytime	6.0
	Night time	2.0
Office	Daytime	12.7
	Night time	12.7
Workshops	Daytime	12.7
	Night time	12.7

Note: The limits imposed in this table are based on Chapter 174-2 of the ENCM. -mean- (rms) vibration limits presented in terms of velocity levels at one-third octave band frequencies applicable between 8Hz (which is the frequency range of interest for construction) determined for normal construction activities to protect human comfort and to provide adequate protection against potential damage to building structures.

3.0 CONSTRUCTION NOISE ASSESSMENT

To quantify noise levels from the envisaged construction activities modeling has considered noise mitigation associated with distance separation, onsite shielding from existing structures and noise reductions from the existing acoustic wall on the Dennistoun Street site boundary.

3.1 Noise Receivers

The site approval conditions refer to three (3) reference residential properties for assessing noise impacts; 69 Dennistoun Street, 29 Dennistoun Street and 64 Byron Road *(Attachment 1)*.

3.2 Construction Equipment

The four (4) main phases of the construction works include demolition, earthworks, concrete works and construction. Sound power levels for typical construction plant applied in the modeling are listed below.

Table 3. Plant and Equipment Sound Power Levels

dBA re: 10^{-12} Watts

Scenario	Activity	Plant	Sound Power Level dBA		Estimated Duration of Associated Works
			Item	Activity	
Demolition	Demolition of Building 3	Excavator with Breaker	121	121	6 weeks
		Excavator	109		
		Trucks	106		
Earthworks	Earthworks Building 3 and 8A	Excavator	109	115	4 weeks
		Dozer	110		
		Roller	104		
		Grader	108		
		Trucks	106		
Concrete	Foundations Floors Driveways Buildings 3 and 8A	Concrete Truck/Agitator	106	110	3 weeks
		Concrete pump	106		
		Truck	103		
		Hand Tools	94		
Construction	Buildings 3 and 8A	Mobile Crane	100	106	20 weeks
		Trucks	103		
		Hand Tools	94		
		Scissor Lift	92		

3.3 Assessment

Considering the location of the envisaged site works, a range of sound pressure levels from the activities has been predicted taking into account the location of plant/equipment, distance attenuation and site shielding to establish a range of sound pressure level contributions.

Table 4. Predicted Sound Pressure Level Contributions

L_{Aeq} dB(A) re: 20 × 10^{-6} Pa

Activity	Predicted Range of Sound Pressure Levels $L_{Aeq,15min}$ dBA		
	Location 1 69 Dennistoun Avenue	Location 2 29 Dennistoun Avenue	Location 3 64 Byron Road
Demolition	32-47	25-40	12-27
Earthworks	37-47	30-35	17-21
Concrete Works	24-42	17-30	4-16
Construction	21-38	14-26	1-12

Noise emissions predicted from the envisaged demolition, earthworks, concreting and construction activities have demonstrated that noise during the proposed works can be managed to satisfy the Site Specific Noise Management Levels (NML's). During demolition works noise from the breaker is predicted to marginally satisfy the NML's at Locations 1 and 2, and may require consideration of implementing 'respite' periods for its use through the Noise and Vibration Management Plan.

4.0 CONSTRUCTION VIBRATION ASSESSMENT

4.1 Plant/Equipment Vibration Levels

During the envisaged demolition and earthworks, it will be necessary to use plant and equipment that will generate ground vibration. The main source of vibration identified would be associated with breakers and vibratory rollers. To evaluate the likely effects of vibration during the site works, the following plant/equipment vibration levels (*Table 5*) have been considered.

Table 5. Plant/Equipment Vibration Levels

mm/sec

Plant Description	Vibration Levels mm/sec		
	@ 5m	@ 20m	@ 40m
Breaker	4.5	0.4	0.1
Dozer	2	0.2	
Vibratory Roller	20	2	0.3

4.2 Assessment

Ground induced vibration from demolition and earthworks has the potential to impact on nearby properties. The distance separation between the envisaged site activities and the closest residential property on Dennistoun Avenue ranges between 130 - 400 metres. From the levels summarised in *Table 5* the daytime management vibration level of 6mm/sec is satisfied at a distance of 20m from the plant/equipment and clearly satisfy the project management levels for the closest residential properties.

5.0 CONSTRUCTION NOISE and VIBRATION MANAGEMENT

Management of noise and vibration during demolition, earthworks, concreting and construction will be controlled through a number of key steps including:

- site induction of all personnel/contractor in correct use of plant and equipment to minimise noise and vibration emissions;
- selection of plant and equipment to take into account acoustic performance where practical;
- construction activities between the standard hours:
  7.00am to 6.00pm Monday to Friday
  8.00am to 1.00pm Saturday;
- if required, provide respite periods from noisy breaker activities including before 8.00am and lunch respite period of two (2) hours from 11.30am-1.30pm or as agreed with residents;
- siting of fixed plant and equipment to maximise distance separation; and
- provision of Site Foreman or Designate contact details for residents seeking information.

ATTACHMENT 1. SITE LOCATION

ATTACHMENT 2. PART SITE LAYOUT