



## **CAPITAL PRUDENTIAL**

### **COMMERCIAL DEVELOPMENT 3 LARSEN ROAD, BYFORD**

## **ENVIRONMENTAL ACOUSTIC ASSESSMENT**

NOVEMBER 2023

OUR REFERENCE: 31869-2-23358

DOCUMENT CONTROL PAGE

**ENVIRONMENTAL ACOUSTIC ASSESSMENT  
3 LARSEN ROAD, BYFORD**

Job No: 23358

Document Reference: 31869-2-23358

FOR

**CAPITAL PRUDENTIAL**

**DOCUMENT INFORMATION**

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<b>Date of Issue:</b>	15 November 2023		

**REVISION HISTORY**

Revision	Description	Date	Author	Checked
1	Original Issue	15/11/23	GH	TR
2	Updated Plans	17/11/23	GH	TR

**DOCUMENT DISTRIBUTION**

Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
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## 1. INTRODUCTION

Herring Storer Acoustics were commissioned by Capital Prudential to carry out an acoustic study with regards to compliance with the requirements of the Environmental Protection (Noise) Regulations 1997 for the proposed commercial development at 3 Larsen Road, Byford.

Based on information provided, noise emissions from associated with the operation of the development at 3 Larsen Road, Byford would meet the *Environmental Protection (Noise) Regulations 1997*.

This assessment contains details of noise associated with mechanical plant, fast food premises, car wash, deliveries, service station as well as car movements throughout the site.

## 2. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below in Table 1. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

**TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL**

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L <sub>A10</sub>	L <sub>A1</sub>	L <sub>Amax</sub>
Noise sensitive premises	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF
Commercial premises	All Hours	60	75	80

Note: L<sub>A10</sub> is the noise level exceeded for 10% of the time.  
 L<sub>A1</sub> is the noise level exceeded for 1% of the time.  
 L<sub>Amax</sub> is the maximum noise level.  
 IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

**“impulsiveness”** means a variation in the emission of a noise where the difference between L<sub>Apeak</sub> and L<sub>Amax Slow</sub> is more than 15 dB when determined for a single representative event;

**“modulation”** means a variation in the emission of noise that –

- (a) is more than 3dB L<sub>A Fast</sub> or is more than 3 dB L<sub>A Fast</sub> in any one-third octave band;
- (b) is present for more at least 10% of the representative assessment period; and
- (c) is regular, cyclic and audible;

**“tonality”**

means the presence in the noise emission of tonal characteristics where the difference between –

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3dB when the sound pressure levels are determined as  $L_{Aeq,T}$  levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as  $L_{A,slow}$  levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 2 below.

**TABLE 2 – ADJUSTMENTS TO MEASURED NOISE LEVELS**

Where <b>tonality</b> is present	Where <b>modulation</b> is present	Where <b>impulsiveness</b> is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

The nearest affected locations have been shown on Figure 1 and identified as:

- R1 – Residential Premises to the North at 10 Larsen Road
- R2 – Residential Premises to the North at 2-8 Larsen Road
- R1 – Noise sensitive premises to the East on South Western Highway
- C4 – Commercial Premises to the South
- R5 – School to the East

The influencing factor at the residential premises R1 has been determined to be +3 dB;

- 18% commercial in inner circle;
- 2% commercial in outer circle;
- within 450m of South Western Highway.

The influencing factor at the residential premises R2 and R3 has been determined to be +7 dB;

- 18% commercial in inner circle;
- 2% commercial in outer circle;
- within 450m of South Western Highway.

The influencing factor at the residential premises R5 has been determined to be +2 dB;

- within 450m of South Western Highway.



**FIGURE 1 – AREA MAP**

Accordingly, the Assigned Noise Levels are as per Table 3 below.

**TABLE 3 - ASSIGNED OUTDOOR NOISE LEVEL**

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L <sub>A10</sub>	L <sub>A1</sub>	L <sub>Amax</sub>
R1	0700 – 1900 hours Monday to Saturday	48	58	68
	0900 - 1900 hours Sunday and Public Holidays	43	53	68
	1900 – 2200 hours all days	43	53	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	38	48	58
R2, R3	0700 – 1900 hours Monday to Saturday	52	62	72
	0900 - 1900 hours Sunday and Public Holidays	47	57	72
	1900 – 2200 hours all days	47	57	62
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	42	52	62
R5	0700 – 1900 hours Monday to Saturday	47	57	67
	0900 - 1900 hours Sunday and Public Holidays	42	52	67
	1900 – 2200 hours all days	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	37	47	57
Commercial Premises; C4	All Hours	60	75	80

Notes: L<sub>A10</sub> is the noise level exceeded for 10% of the time.  
 L<sub>A1</sub> is the noise level exceeded for 1% of the time.  
 L<sub>Amax</sub> is the maximum noise level.

### 3. CALCULATED NOISE LEVELS

Based on information provided, we believe that the following scenarios are representative of the development.

- Scenario 1: Mechanical Plant; Assessed against  $L_{A10}$  for all hours.
- All mechanical plant operating simultaneously for accommodation and services. During the night time period, mechanical plant has been assumed to in "Night Mode". This would be considered conservative as diversity of operation would not necessarily have all pieces of plant operating simultaneously. Emissions have been considered tonal and attract a +5 dB(A) penalty.
- Scenario 2: Car Movements within Drive through; assessed against  $L_{A1}$  for all hours.
- Noise associated with individual car movements whilst in drive through.
- Scenario 3: Car Movements around site; assessed against  $L_{A1}$  for all hours.
- Noise associated with individual car movements around the site.
- Scenario 4: Car Door Closing; assessed against  $L_{Amax}$  for all hours.
- Noise associated with an individual car door closing at the most critical location. Emissions have been considered impulsive and attract a +10 dB(A) penalty.
- Scenario 5: Car Engine Starts; assessed against  $L_{Amax}$  for all hours.
- Noise associated with an individual car start at the most critical location.
- Scenario 6: Service Centre Operations; assessed against  $L_{A10}$  for all hours.
- Noise associated with the operation of the service centre; doors open.
- Scenario 7: Car Wash; assessed against  $L_{A10}$  for all hours.
- Noise associated with car wash operations, all units operating simultaneously, doors open.
- Scenario 8: Delivery Trucks; assessed against  $L_{A1}$  for all hours.
- Noise associated with delivery of goods to loading docks.

Note: The *Environmental Protection (Noise) Regulations 1997* state that noise associated with cars movements and cars starting are exempt from complying with the Regulations. However, noise emissions from car doors are not strictly exempt from the Regulations. As a result, door slams, engine starts and car movements on site have all been assessed.

To determine the noise at each receiver for each scenario, Sound Power Levels listed in Table 4 have been utilised.

**TABLE 4 – SOUND POWER LEVEL**

Item	Sound Power Level dB(A)
Air conditioning Unit	68 (65 Night Mode)
Kitchen Exhaust	75
Glass Dropping in Bin	110 L <sub>AMax</sub>
Car Door Slam	87 L <sub>Amax</sub>
Car Start	85 L <sub>Amax</sub>
Car Movement	81 L <sub>A1</sub>
Delivery Truck	85 L <sub>A1</sub>
Vacuum Units – with acoustic hood	82
Self Carwash Water Jets	94
Auto Car Wash Equipment – No Doors	87
Dog Wash Unit	88

Using the above sound power level and development plans (Attached), modelling software “SoundPLAN” was utilised to calculate the noise highest noise level received at each of the premises, shown below, including any appropriate penalty. For brevity, the operations have only been assessed against the most stringent time period. Note, as there is a cumulative assessment for the car wash operations, tonality has been included into the modelled noise levels of Vacuum Units and Dog Wash Units.

**TABLE 5 – CALCULATED NOISE LEVELS**

Location	Noise Level dB(A)							
	S1	S2	S3	S4	S5	S6	S7	S8
R1	33 [38]	33	34	40 [50]	38	17	36	30
R2	37 [42]	37	45	46 [56]	44	17	40	40
R3	35 [40]	35	35	39 [49]	37	37	40	32
C4	41 [46]	41	46	56 [66]	52	49	56	38
R5	23 [28]	23	23	28 [38]	26	24	33	19

#### 4. ASSESSMENT

Tables 6 to 13 identify provide the assessment for each of the eight scenarios based on the information presented in Section 4.

**TABLE 6 – ASSESSMENT OF SCENARIO 1 – MECHANICAL PLANT**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>A10</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	38	Night Time	38	Complies
R2	42	Night Time	42	Complies
R3	40	Night Time	46	Complies
C4	46	Night Time	60	Complies
R5	28	Night Time	37	Complies

**TABLE 7 – ASSESSMENT OF SCENARIO 2 – CAR MOVEMENTS IN DRIVE THROUGH**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>A1</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	33	Night Time	48	Complies
R2	37	Night Time	52	Complies
R3	35	Night Time	56	Complies
C4	41	Night Time	75	Complies
R5	23	Night Time	47	Complies



**TABLE 8 – ASSESSMENT OF SCENARIO 3 - CAR MOVEMENTS AROUND SITE**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>A1</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	34	Night Time	48	Complies
R2	45	Night Time	52	Complies
R3	35	Night Time	56	Complies
C4	46	Night Time	75	Complies
R5	23	Night Time	47	Complies

**TABLE 9 – ASSESSMENT OF SCENARIO 4 - CAR DOOR SLAMS**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>AMax</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	50	Night Time	58	Complies
R2	56	Night Time	62	Complies
R3	49	Night Time	66	Complies
C4	66	Night Time	80	Complies
R5	38	Night Time	57	Complies

**TABLE 10 – ASSESSMENT OF SCENARIO 5 - CAR ENGINE STARTS**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>AMax</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	38	Night Time	58	Complies
R2	44	Night Time	62	Complies
R3	37	Night Time	66	Complies
C4	52	Night Time	80	Complies
R5	26	Night Time	57	Complies

**TABLE 11 – ASSESSMENT OF SCENARIO 6 - SERVICE CENTRE**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>A10</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	17	Night Time	38	Complies
R2	17	Night Time	42	Complies
R3	37	Night Time	46	Complies
C4	49	Night Time	60	Complies
R5	24	Night Time	37	Complies

**TABLE 12 – ASSESSMENT OF SCENARIO 7 – CAR WASH**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>A10</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	36	Night Time	38	Complies
R2	40	Night Time	42	Complies
R3	40	Night Time	46	Complies
C4	56	Night Time	60	Complies
R5	33	Night Time	37	Complies

**TABLE 13 – ASSESSMENT OF SCENARIO 8 – DELIVERY TRUCKS**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L <sub>A1</sub> Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	30	Night Time	48	Complies
R2	40	Night Time	52	Complies
R3	32	Night Time	56	Complies
C4	38	Night Time	75	Complies
R5	19	Night Time	47	Complies

## 5. CONCLUSION

Based on the above, noise from the proposed development to the adjacent premises would comply with the *Environmental Protection (Noise) Regulations 1997* at their prescribed periods.

It is noted that hooded vacuum units were utilised for the assessment of the carwash, and it is recommended that, if possible, doors be closed on the Service Centre and Carwash where practicable to minimise noise spread.

Finally, specific mechanical plant section has note been made, and this report would require updating once this has been finalised to ensure that compliance is still met.

# **APPENDIX A**

## **PLANS**



NOTE:  
THE SITE PLAN IS SUBJECT TO CHANGE PENDING RECEIPT OF THE FOLLOWING:

- PLANNING ADVICE
- TRAFFIC ADVICE
- SITE SERVICES BASEMENTS ETC. IBC
- TRAFFIC DISTANCES TO BE REVIEWED

B	ISSUE FOR INFORMATION	REV	LM	25/11/2023
A	ISSUE FOR REVIEW	JSLJK	LM	27/10/2023
	revisory issue	drawn by	checked by	date
	project	drawn	checked	date
<b>COMMERCIAL DEVELOPMENT</b>		drawn	checked	date
3 Larsen Road, Byford		checked	checked	date
<b>Hodge Collard Preston</b> <small>Architects &amp; Planners</small>		<small>1000 Main Street, Byford, SA 5092</small> <small>PO Box 100, Main Street, WA 6077</small> <small>Ph: (08) 8377 1144</small> <small>Fax: (08) 8377 1144</small> <small>Email: <a href="mailto:enquiries@hodgecollard.com">enquiries@hodgecollard.com</a></small>	<small>REVISED</small> <small>DATE</small>	<small>PROJECT NO</small> <b>71.23</b> <small>REV</small> <b>B</b>