Western Power Depot
Jandakot Airport Master Plan
Preliminary Environmental Noise Impact Assessment

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Revision Table

Report revision	Date	Comments
0	19 October 2017	Issued to client
1	25 October 2017	Updated with client feedback
2	15 January 2018	Issued to client

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of that sound level.
dB(A)	Units of the A-weighted sound level.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
L_{10}	Noise level exceeded for 10 % of the measurement time. The L_{10} level represents the typical upper noise level and is often used to represent traffic or music noise.
L_1	Noise level exceeded for 1 % of the measurement time. The L_1 level represents mostly short duration, high level sound events.
L_{max}	The maximum instantaneous noise level.

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1 Introduction

Resonate Acoustics has been engaged by Urbis Pty Ltd to prepare a planning stage acoustic report for the proposed new Western Power Depot at Jandakot Airport.

This report covers the main types of environmental noise emission from the site as part of the study:

- Vehicle movements on site
- Staff activities
- Tools and compressors (workshop building)
- Mechanical plant and generators

2 Project Description

The new proposed Western Power Depot is to be located at 'Site 516' and consists of administration offices, warehouse and workshop space, vehicle maintenance facilities, storage, and parking. It is planned to operate during the day, and will attended by 750 staff.

The development site is shown below in Figure 1 in the context of acoustically significant features. The nearest sensitive receiver is the residential property at 41 Boeing Way approximately 150 m south of the site boundary. This residential property will be used to assess compliance of the proposed development with the Environmental Protection (Noise) Regulations 1997.

The roads within 100 m of the site have a traffic count of less than 15,000 per day and are therefore not classified as 'major roads' under State Planning Policy 5.4. On this basis an assessment of noise emission from traffic either generated by this site, or otherwise on local roads, is not required.

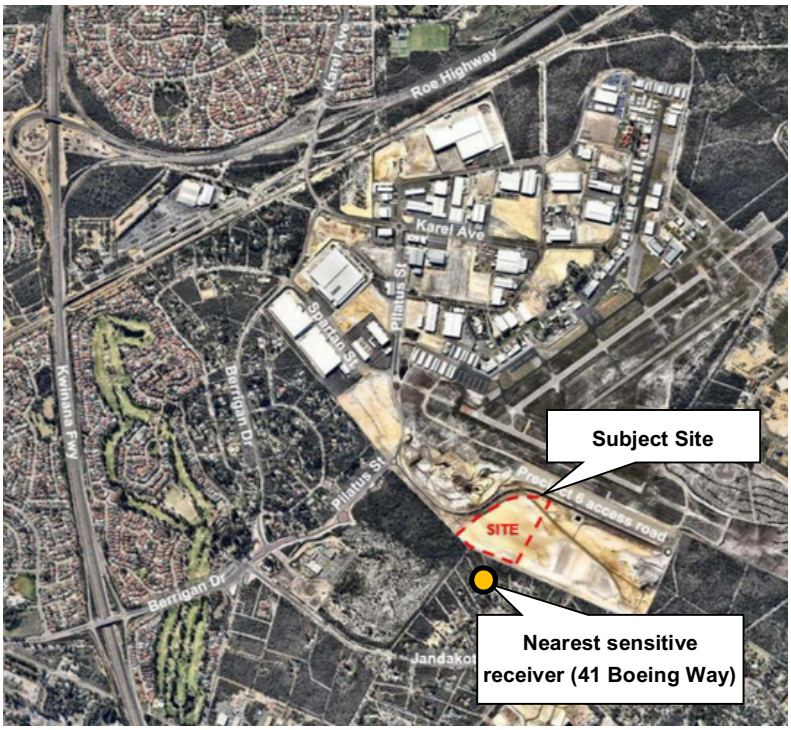

Figure 1: Development Site Detail and Surrounds

3 Criteria

The site is located on Federal land associated with Jandakot Airport. WA State legislation and noise limits do not apply to activity undertaken on Federal land. The Commonwealth Airports Act 1996, however references the requirement to undertake an assessment of, and the control of environmental impact in Section 71 (h) (iii) and (vi)

However, as there is no specific Federal noise control legislation on this subject, the following State legislation has been used as a guide for the assessment of environmental noise impact

3.1 Environmental Protection (Noise) Regulations 1997

The Western Australian Environmental Protection (Noise) Regulations 1997 provide limits for acceptable noise from operations associated with industrial or commercial premises. The allowable noise level (called 'Assigned Noise Level') is affected by the time of day as follows:

- Lowest levels at night (10 pm to 7 am any day or to 9 am Sundays and Public Holidays);
- Higher levels during the evenings (7 pm to 10 pm) and on Sundays and Public Holidays (9 am to 7 pm); and
- Highest levels during the day (7 am to 7 pm Monday to Saturday).

These Assigned Noise Levels may also be modified (i.e. increased) if there are significant influencing land uses within 100 m and 450 m radii of the sensitive receiver including:

- industrial land use zonings;
- commercial zonings; and
- the presence of major roads.

Significant industrially zoned land, as well as the major roads in the area have been assessed and the environmental noise emission criteria (assigned levels) include these influencing factors have been derived for sensitive receivers impacted by the site.

Regarding major roads, Jandakot Road was measured in 2017 to carry 14,862 vehicles per day (Mar 2017). This number of vehicles is close to 15,000 vpd which is the threshold for consideration of a 'Major' road under the Environmental Protection (Noise) Regulations 1997. Where natural growth in traffic volumes is approximately 2 - 5% pA, the overall traffic volume in this area will exceed 15,000 vpd by 2018.

The assigned levels are presented in Table 1.

Table 1 Environmental noise emission goals for Residential Receivers on Boeing Way

Type of premises receiving noise	Time of day	Assigned level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday	48	58	68
	0900 to 1900 hours Sunday and public holidays	43	53	68
	1900 to 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
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial and utility premises other than those in the Kwinana Industrial Area	All hours	65	80	90

Note that penalties are applied to the noise sources for a variety of characteristics evident at the receiver locations. In the unlikely event that tonality, impulsiveness or modulation is present in the noise signals then rectification measures are required to remove these characteristics from the noise source, where practicable. Otherwise a 5 dB more-stringent criterion would need to be considered

3.2 Ambient Noise Environment

The ambient noise environment in the nearby residential area is characterised by aircraft noise from Jandakot Airport and vehicle noise from Jandakot Road, as previously described above.

4 Assessment

4.1 Description of noise sources

Most activities associated with the proposed development occur within the internal areas of the buildings, except for the manoeuvring of vehicles in and around the site. No regular manufacturing or fabrication processes are proposed at the depot.

The forecast traffic movements on site are approx. 2000 vehicles per day, of which 11% are heavy vehicles. The location of noise sources is annotated in Figure 3. These vehicles include:

- Heavy Fleet (Large): 4m wide x 12.5m long x 4m high clear (includes EWP's Crane Borers, Crane, Jinkers).
- Heavy Fleet (Small): 3m wide x 6m long x 4m high clear (Tractor, Trailers, Forklifts, Fire Pump Equipment).
- Light Fleet: 2.6m wide x 5.5m long x 2.5m high clear (typically 4wd vehicles, some with racks and roof mounted equipment).

4.2 Required treatments

- A 2.7 - 3.0 m high solid barrier is recommended along the southern boundary. Preliminary construction materials to be considered include:
    - Either
        - 0.42 mm BMT Colorbond Steel sheeting on external skin
        - internal skin of 9mm Fibrous Cement mounted on a minimum 75 mm steel post, to a height of 2.1 m
        - 75 mm wall cavity filled to be filled with hydrophobic, bagged acoustic insulation, 50 mm thick, 11 kg/m3 glasswool
        - A single Colorbond skin above 2.1m is acceptable.
    - Or
        - Minimum 90 mm masonry/concrete

- The combined sound power level of the mechanical plant shall not exceed L_{A10} 98 dB during the day.
    - If any mechanical plant selected for the site is tonal in nature (at the nearest residences as per the Environmental Protection (Noise) Regulations 1997 definition), then the maximum permissible combined sound power level of the selection shall be 5 dB lower (ie L_{A10} 93 dB).
    - The allowable level may be increased by 5 dB if a solid barrier is installed which matches the height of the condensers and blocks the line of sight to the nearest sensitive receivers.
- The use of pneumatic tools within the workshop must be accompanied by one of the following
    - the adjusted sound power of equipment not to exceed L_{Amax} 116 dB
    - quiet equipment is purchased with an adjusted sound power level no greater than L_{Amax} 105 dB, or
    - sufficient acoustic absorption is introduced into the workshop that the sound pressure level outside the open roller shutter doors does not exceed 82 dB

4.3 Noise forecast

The forecast noise level at 41 Boeing Way, within 15 m of noise sensitive buildings (Receiver A) is provided in Table 2. These forecasts are based on the implementation of the noise management plan as outlined in Appendix A, and have been assessed for day-time operation when the facility is intended to operate.

70 heavy vehicle movements per hour have been modelled, along with 20 medium and 11 light vehicles. The heavy vehicle start / acceleration is frequent enough to influence the L_{A10} noise statistic.

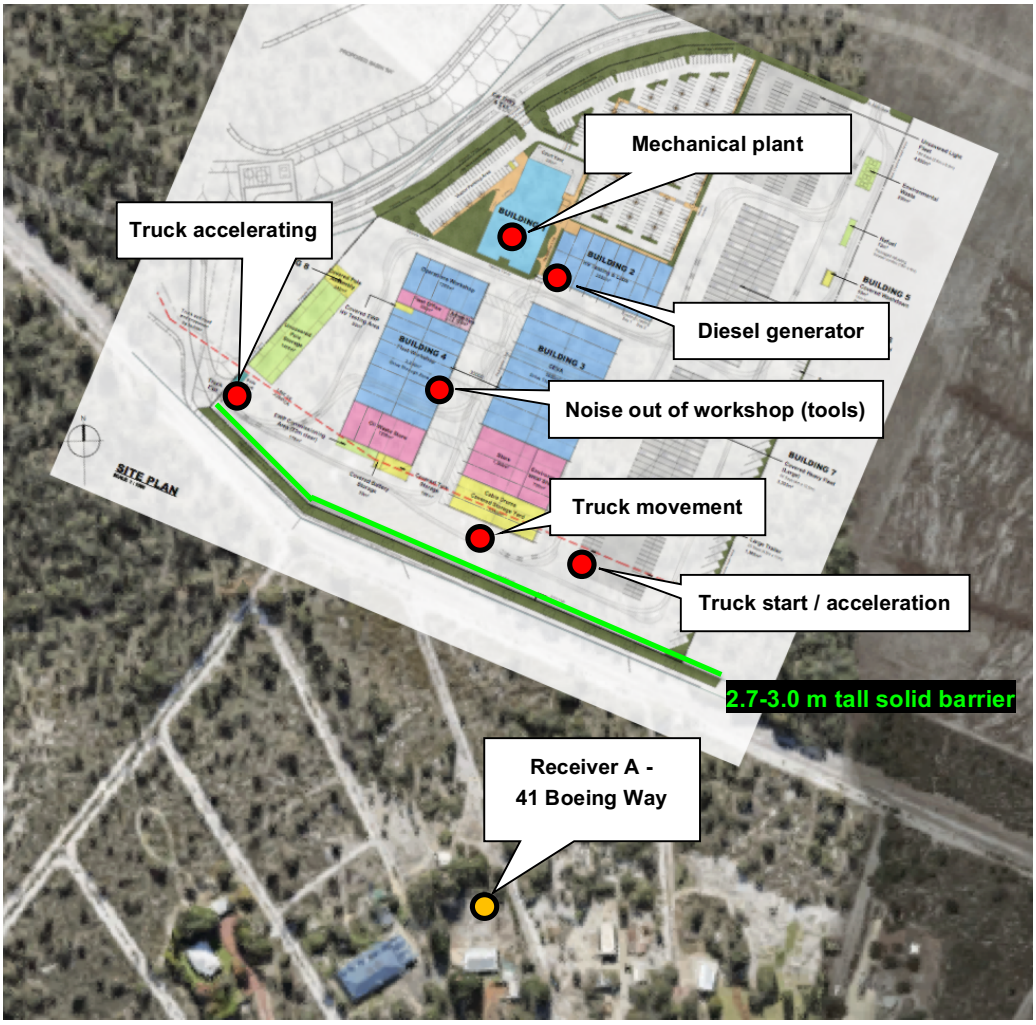

Figure 2: Dominant noise sources (red) and sensitive receiver (gold) locations

Table 2 – Noise forecast at Receiver A, day-time

Noise Statistic	Noise Source (Individual Contributions)	Sound Power Level, adjusted (dB)	Adjustment included	Individual Forecast (dB)	Overall Forecast (dB)	Assigned Level, Day (dB)	Meets Assigned Level
L_{A10}	Vehicle Start/Accelerate Moving	 104 101	 10/5 5	47	48	48	Yes
	Mechanical plant*	98	5	39			
	Generator*	94	5	32			
	Forklift	83	5	35			
L_{A1}	Vehicle Start/Accelerate Moving	 105 101	 10/5 5	50	58	58	Yes
	Pneumatic tools in workshop*	105-116	10	47-58			
	Mechanical plant*	100	5	41			
	Generator*	95	5	15			
	Forklift	83	5	35			
L_{Amax}	Vehicle movements	106	5	53	58	68	Yes
	Pneumatic tools in workshop*	105-116	10	58			
	Mechanical plant*	100	5	41			
	Generator*	96	5	16			

Note: * Noise levels have been adjusted for intrusive and dominant characteristics

5 Conclusions

A preliminary assessment of environmental noise emission has been undertaken for activity associated with the proposed Western Power Depot at Jandakot Airport.

The forecasts under the appended noise management plan show that environmental noise emission from the development site meets the Environment Protection (Noise) Regulations 1997 criteria developed for the area surrounding the site.

Appendix A: Noise Management Plan

Based on the assessment above the following treatments and management practices are recommended for inclusion as part of the operation plan for the facility:

- A 2.7 - 3.0 m high solid barrier is recommended along the southern boundary. Preliminary construction materials to be considered include:
    - Either
        - 0.42 mm BMT Colorbond Steel sheeting on external skin
        - internal skin of 9mm Fibrous Cement mounted on a minimum 75 mm steel post, to a height of 2.1 m
        - 75 mm wall cavity filled to be filled with hydrophobic, bagged acoustic insulation, 50 mm thick, 11 kg/m3 glasswool
        - A single Colorbond skin above 2.1m is acceptable.
    - Or
        - Minimum 90 mm masonry/concrete

- The combined sound power level of the mechanical plant shall not exceed L_{A10} 98 dB during the day.
    - If any mechanical plant selected for the site is tonal in nature (at the nearest residences as per the Environmental Protection (Noise) Regulations 1997 definition), then the maximum permissible combined sound power level of the selection shall be 5 dB lower (ie L_{A10} 93 dB).
    - The allowable level may be increased by 5 dB if a solid barrier is installed which matches the height of the condensers and blocks the line of sight to the nearest sensitive receivers.
- The use of pneumatic tools within the workshop must be accompanied by one of the following
    - the adjusted sound power of equipment not to exceed L_{Amax} 116 dB
    - quiet equipment is purchased with an adjusted sound power level no greater than L_{Amax} 105 dB, or
    - sufficient acoustic absorption is introduced into the workshop that the sound pressure level outside the open roller shutter doors does not exceed 82 dB
- All new grilles or storm water grates are to be installed to be tight fitting. Where there is a potential for vehicles to drive over such grates/covers, noise from loose fitting grates is to be avoided. Where there is the potential for such noise source, hard rubber or other durable materials are to be used for cushioning such grates/covers