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Subject	ATP Locomotive Workshop – Innovation Plaza MOD application		

1 Executive summary

Arup was engaged to prepare an acoustic assessment to support a DA conditions modification for the development at the Locomotive Workshop of the Australian Technology Park with regards to Condition A19 of the Development Consent (SSD 8517).

The assessment has found the proposed modification of the development to satisfy the recommendations of the Acoustic Assessment *AC06 (v2) ATP Loco SSD Retail Acoustics*, prepared by Arup, in line with Condition E18 of the Development Consent (SSD 8517).

For the subject modification, the assessment is relevant only to the proposed extension of outdoor seating areas along Innovation Plaza.

2 Criteria

Condition A19 of the Development Consent (SSD 8517) for the Locomotive Workshops (Bays 1-4a) states:

> *This consent does not approve the following components of the development: (…)*
>
> *(g) the operation of the outdoor seating areas within Innovation Plaza and Locomotive Street, including the exact location, size, number of seats, hours of operation and management.*

Additionally, Condition E18 of SSD 8517, regarding Acoustic Compliance states:

> *Prior to the issue of the first Occupation Certificate, or commencement of use, whichever occurs first, evidence shall be submitted to the PCA demonstrating compliance with all recommendations of the Acoustic Assessment, prepared by Arup, and amended reports submitted as part of the EIS and the development achieves compliance with the requirements of the State Environmental Planning Policy (Infrastructure) 2007 and other guidelines applicable to the development.*

The relevant recommendations in the Acoustic Assessment regarding project specific external noise emission criteria is presented in Table 1.

Table 1: Project Specific Noise Levels at Noise Sensitive Receivers

Receiver	**Time period**[2]	**Project goals**	
		Intrusive $dBL_{Aeq, 15\ min}$	**Amenity** $dBL_{Aeq, period}$
Residential receivers			
All residential	Day	51	60
	Evening	51	50
	Shoulder[1] – 10pm-12am	48	47
	Night	47	45
Other sensitive receivers			
C1-C5	Use hours	-	65
I1-I3	Use hours	-	70
E1-E2 (internal)	Use hours	-	35

Notes:

1 – Shoulder period amenity goals taken as average between evening and night-time.

2 – Monday to Saturday, Day, 7.00am to 6.00pm; Evening 6.00pm to 10.00pm; Night 10.00pm to 7.00am

Sundays & Public Holidays, Day 8.00am - 6.00pm; Evening 6.00pm - 10.00pm; Night 10.00pm - 8.00 am.

3 – While not specifically outlined in the DA conditions of consent, criteria for emergency equipment is recommended to be 5dB above the external noise project limits

3 Operational noise assessment

Noise levels from patrons in outdoor areas have been predicted using formula established in Hayne et al. [1], which is considered appropriate for the general restaurant and food & beverage uses:

$$L_{WAeq} = 15 \cdot log(Crowd\ size) + 64\ dB(A)$$

This methodology has been adopted for outdoor seating along Innovation Plaza, including the retail tenancy on the southeast corner of Bay 1. Note this does not consider background music in outdoor areas. Table 2 presents a number of scenarios with a range of patron numbers which have been assessed for the proposed extended outdoor seating areas shown in Figure 1.

Table 2: Patron numbers per area under each assessed scenario

Area	**Number of outdoor patrons before 10pm**		**Number of outdoor patrons after 10pm and before 12 midnight**	
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**
1	130	80	78	60
2	60	60	38	38
3	0	50	0	22
4	30	30	0	0
Total	**220**	**220**	**116**	**120**

Spectra have been based on Klark Teknik [2] using the male raised voice spectrum presented in Table 3. The vocal spectrum has been normalised to the calculated sound power level for the assessment.

Table 3: Male raised vocal spectrum

Description	**dB(A)**	**Octave Band Centre Frequency, Hz, dBZ**						
		125	**250**	**500**	**1 k**	**2 k**	**4 k**	**8 k**
Vocal spectrum (raised voices)	65	53	61	64	61	57	51	44

Noise predictions in Table 4 have been carried out to the nearest most potentially affected residential receiver locations at Cornwallis Street, Redfern.

Table 4: Predicted noise levels

Scenario	**Predicted noise level, $L_{Aeq(15\ min)}$**	**Criteria**		**Complies?**
		Period	**Level, $L_{Aeq(15\ min)}$**	
1	51	Day / Evening	51	YES
2	51	Day / Evening	51	YES
3	48	10pm to 12am	48	YES
4	48	10pm to 12am	48	YES

No operational noise emissions have been considered after 12 midnight in line with the recommendations in the Acoustic Assessment *AC06 (v2) ATP Loco SSD Retail Acoustics*, prepared by Arup.

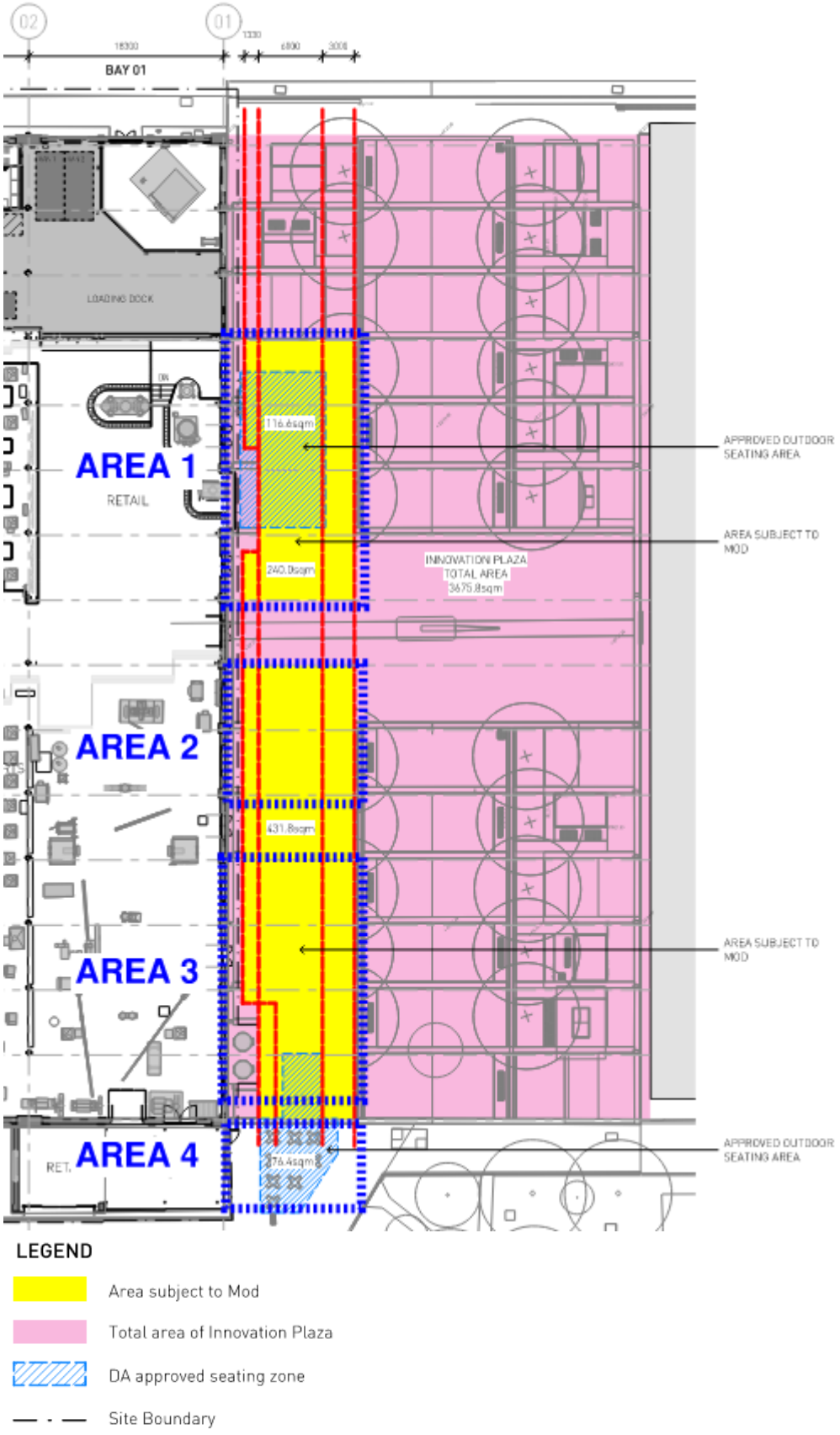

Figure 1: Proposed extension of outdoor seating areas along Innovation Plaza

4 Discussion and recommendations

An operational noise assessment of a range of scenarios with varying occupancy numbers were carried out for the proposed extension of outdoor seating areas along Innovation Plaza.

The assessment concludes that the proposed extension allows flexibility of seating configurations for future tenants to make use of the outdoor areas while complying with the external noise emission criteria for the project.

The assessment does not consider background music in outdoor areas. Sources of outdoor music such as PA systems are recommended to be set at a level sufficiently low as to not contribute to the cumulative external noise emissions or cause an increase in speech levels from patrons in outdoor areas.

It is recommended that future retail DA applications undertake independent assessments considering the proposed number of outdoor patrons, density and specific use of the area, with approval subject to demonstration of compliance with the project external noise emission criteria.

Additionally, it is recommended that future retail uses implement an operational noise management strategy to manage noise emissions and are subject to review of compliance of the external noise emissions criteria post occupation.

References

[1] M. Hayne, J. Taylor, R. Rumble and D. Mee, “Prediction of Noise from Small to Medium Sized Crowds,” in *Acoustics 2011*, Gold Coast, 2011.

[2] Mapp, P (ed)/Klark Teknik, The Audio System Designer Technical Reference, Chapman Partnership.

DOCUMENT CHECKING (not mandatory for File Note)

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