

# Malcolm Hunt Associates



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Project / Site	KSS Apartments 57-59 Kingsford Smith Street Rongotai  C/o Morgan Slyfield Stout Street Chambers PO Box 117 Wellington 6140
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## Further Information – KSS Apartments - Outdoor Noise

Ref. WCC Service Request No: 387233, File Reference: 1057423  
Request For further Information dated 30 January 2018

Dear Morgan,

As requested, we have conducted further site-specific acoustic investigations in response to the WCC request to provide further information on the “*level of noise expected in the outdoor areas of the development, specifically in the internal courtyard*” of the apartment complex proposed for 57-59 Kingsford Smith Street, Rongotai.

We set out below information in response to this request, including some recent field observations and comments on information provided to date.

### Outdoor Noise Level Information Provided To Date

Our 2017 Noise AEE report<sup>1</sup> set out in Section 4 the results of outdoor noise measurements taken near ground level at two locations on the site perimeter. Levels of aircraft noise events in Section 4.2 indicate the loudest events were associated with Boeing 777-200 movements. The maximum levels registering at Site B (Lyal Bay Parade) at around  $L_{AFMax}$  82 dB. This level of aircraft noise was estimated to reach  $L_{AFMax}$  84.7 dB for the most elevated receiving location within the proposed apartments, an east-facing deck located on the fifth floor of the proposed building. The increase of 2 to 3 dB compared to the ‘near ground level’ measurement location is due to the aircraft sound being less screened at elevated receiving locations.

In order to provide further information in relation to outdoor noise levels in the courtyard, we have further examined acoustic screening provided by the proposed apartment building itself and built environment surrounding the site. We have considered acoustic screening of the sounds from the

<sup>1</sup> MHA Acoustic Assessment Report “Kingsford Smith Street Apartments, Rongotai Wellington” for KSS Properties Limited, Malcolm Hunt Associates Report Reference: 2378/09-2017

largest jet aircraft using the airport (which includes the B737-800, A230 and the B777-200). Without the effect of the current built environment maximum aircraft noise levels received at the proposed apartment site would register as a much as 5 to 7 dB higher level than the loudest aircraft noise levels currently measured around the site. We have concluded the built environment currently provides considerable acoustic screening to the KSS apartments, including those on the top (5<sup>th</sup>) floor.

The attached diagram (Appendix A) shows (approximately to scale) a cross section of the local built environment and a B777-200 located on the centreline of the airport runway. The shaded area indicates areas where sound from this aircraft would be reduced by acoustic screening due to the existing built environment. While the tail of a B777 jet (17 m above ground level) is likely to be visible to occupants of the top floor KSS apartments but not the aircraft body or engines. We consider noise from the larger aircraft operating to or from the airport received on-site will be significantly screened in some way by the built environment.

### **Outdoor Noise Levels Expected In Courtyard**

Turning to the expected noise effects in the outdoor courtyard area, the Reve Architecture "Design Statement"<sup>2</sup> describes this area as an "interior courtyard" measuring 530 m<sup>2</sup> which accounts for over 25% of the total development site area. This statement describes (at page 20) the courtyard as "*....sheltered from the wind and is shaped to shield the residents from the noise of the runway....*"

We agree the design of the courtyard has a 'wrap-around' effect which, in combination with the surrounding built environment, significantly reduces sound from aircraft operating on the airport runway and on approach or departure from the airport.

To estimate expected sound levels within this outdoor open space we have adopted, as a starting point, the maximum aircraft noise levels measured at ground level at sites A and B referred to in the MHA Noise AEE report.

Maximum aircraft noise levels referred to above are essentially the result of sound either attenuated by significant distance, or screening by the built environment. These effects are also relevant to the aircraft noise received within the courtyard however additional acoustic screening occurs locally, due to the screening of adjacent buildings and by the KSS apartment building itself.

Aircraft noise levels received within the proposed courtyard have been estimated based on;

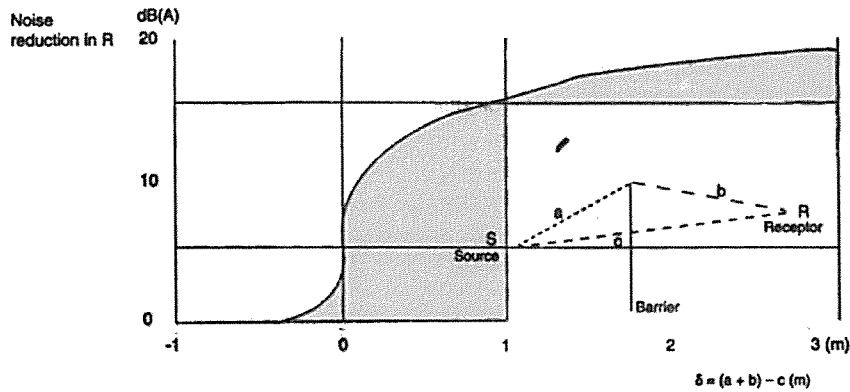
- a) Aircraft noise levels measured at or near ground level at Site B, adjusted downwards to account for additional localised acoustic screening by buildings; and
- b) Aircraft noise levels measured at or near ground level at Site A (for the B777-200 aircraft) which measured  $L_{AFMax}$  76.1 dB. This reading taken at Site A in May 2017 already includes the screening effect of two-storey buildings in a manner similar to the proposed design of the courtyard.

Regarding (a), we have adjusted the Site B measured level by 6.5 dB owing to the increase in (localised) acoustic screening of the two storey commercial buildings located on sites adjacent to the apartment

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<sup>2</sup> *Design Statement & Assessment Against Residential And Business Area Design Guides* by Rêve Architecture Ltd job reference 1718 May 2017.

site. We have calculated this additional screening based on the increase in 'path length difference' between the less well screened Site B compared to the highly screened location within the courtyard (assuming two storey buildings on adjacent sites. The relationship between 'path length distance' and the dB reduction is summarised in the following chart (ref; *Predicting Outdoor Sound* by Keith Attenborough, Kai Ming Li and Kirill Horoshenkov. 2007. ISBN 0-203-08873-5).



Compared to the Site B location we estimate an increase in path the length distance from 0.24 m to 0.72 m which will result in acoustic screening of around 6.5 dB. This indicates maximum outdoor aircraft noise in the courtyard will be received at levels in the order of 82 dB minus 6.5 dB =  $L_{AFMax}$  75.5 dB. This estimate is close to the measured maximum aircraft noise found at Site A ( $L_{AFMax}$  76.1 dB) which is considered to be a location receiving similar acoustic screening of aircraft noise as will be likely found within the proposed courtyard

### Summary Of Outdoor Noise Levels

Although some sound from existing land use activities on other sites is found in the area, noise from aircraft operating at the airport is the most significant source of outdoor noise.

From our investigations we have concluded that due to screening of buildings on other sites in the area, and by the design of the proposed apartment building, noise levels received within the outdoor courtyard area will be reduced to acceptable levels for an urban environment, reaching maximum of around  $L_{AFMax}$  76 dB which represents a noticeable but short-lived, outdoor sound event.

It is noted that the maximum outdoor aircraft noise levels predicted to be received at the KSS apartments (including receiver sites on the 5<sup>th</sup> floor) do not exceed  $L_{AFMax}$  85 dB. A single event noise limit of  $L_{AFMax}$  85 dB is already permitted by the district plan for land use activities within Business 1 zoned sites. Business 1 zone noise Rule 34.6.1.1.1 sets out this limit for single event sounds received at the KSS site arising from any other site in the zone, applying across all times of the day and night.

We have found noise from aircraft and other sources will be significantly mitigated by the built environment and by the distances to the locations where airborne aircraft become visible (as viewed from the apartments). In summary, the levels of noise expected to be received within exterior areas of the apartments and within the courtyard are considered acceptable from a noise effects perspective.

Please do not hesitate to contact the writer if you have any questions.

Regards,

A handwritten signature in black ink, appearing to read 'M. Hunt', written in a cursive style.

Malcolm Hunt  
Principal Acoustic Engineer  
**Malcolm Hunt Associates**  
15 March 2018

**Appendix A – Cross-Section From KSS Apartments to Airport Runway Showing Acoustic Screening Due the Existing Built Environment**  
(approx to scale)

