



MEMORANDUM

DATE:	19 May 2022	RWDI REFERENCE #: 2205373
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FROM:	Justin Leong	EMAIL: justin.leong@rwdi.com
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RE:	Response to Peer Review (Noise and Sound Services) Childcare Centre 16 Bangaroo Street, North Balgowlah	

RWDI has been engaged by Kellie Gielis (the Proponent) to provide a response to a peer review carried out by Noise and Sound Services (NSS) (ref: nss23446, revision A, dated 21 April, 2022) of a Wilkinson Murray (WM) DA Noise Assessment (ref: 20194, version B dated 27 July, 2020 and version C dated 17 May, 2021) for a proposed childcare centre to be located at 16 Bangaroo Street, North Balgowlah. Our responses are presented herein with the section numbering being consistent with the NSS document for ease of reference.

1 Introduction

NSS Comment: *In Version B [of the WM report] it is stated that "The proposed child care centre will accommodate a total of 24 children between the ages of 3 and 6 years old. The centre will operate from 8.30am-4.00pm, Monday to Friday. The client has advised the outdoor play time will be divided amongst the children and have proposed to permit a maximum of 8 children outside at one time". In Version C the total number is reduced from 24 to 20 children. Note: Other documents suggest an 8:00 am start time.*

RWDI Response: The Proponent is unaware of any documentation included in the development application submission that proposes an 8.00am opening time for the childcare centre. NSS does not clarify which document(s) suggest an 8:00am start time and so no further response can be provided to this comment.

2.1 Site Selection

NSS Comment: *The site at 16 Bangaroo Street, North Balgowlah has a boundary with nine close neighbouring properties (including the six residential apartment block at 2 Worrobbil*



Street, North Balgowlah as shown in Figure 1 below) and two other residences marginally affected. On this basis it is clear that the site at 16 Bangaroo Street, North Balgowlah is not a preferred site for a childcare centre. This limits the noise control advice that is available to the acoustical consultant.

RWDI Response: The suitability of the site for use as a childcare centre is ultimately Council's decision and will need to be based on balancing the need for a childcare centre in the local community and managing the potential impacts (such as noise) from the childcare centre.

2.2 Noise Sensitive Receivers

NSS Comment: In each of Wilkinson Murray's reports only five noise sensitive receivers (R01 to R05) have been identified and these are listed in Table 1 (page 6) of both reports. However, the sensitive receiver R03 at 2 Worrobil Street, is, in fact, six sensitive receivers. Therefore, instead of five noise sensitive receivers, as identified by Wilkinson Murray, there are nine noise sensitive receivers or eleven if the marginally affected receivers are included.

RWDI Response: It is unnecessary to identify each of the six residential units within 2 Worrobil Street (R03) as an individual receiver for assessment purposes. The predicted noise emissions from children's indoor and outdoor play in presented in Tables 4-4 and 4-5 of the WM report for receiver R03 were representative of the expected noise impact at the potentially most affected residential units of 2 Worrobil Street on the ground floor and upper floors of this receiver. If predicted noise levels at these locations comply with the noise emission requirements at these locations, then it is expected that noise emissions will comply at all other residential units within the R03 residential unit complex.

2.3 Background Noise Monitoring

NSS Comment: Background noise monitoring has been carried out at three locations within the subject site, rather than the neighbouring premises. These were:

- L01 the front yard, (from Monday 15th June to Wednesday 24th June 2020);
- L02 the backyard ground floor (from Monday 15th June to Wednesday 24th June 2020 and again from 5:00 pm Friday 26th June to 7:30 am Monday 29th June 2020) and
- L03 the rear balcony (from 5:00 pm Friday 26th June to 7:30 am Monday 29th June 2020).

Of these, the most useful would have been the rear balcony as this is the closest to one of the most noise sensitive receivers at unit 4/2 Worrobil Street. Unfortunately, Wilkinson Murray reported that "Technical issues from the rear balcony noise logger (L03) occurred during



monitoring on site. Monitoring was undertaken again between the 26 and 29 June 2020". However, the time period of the background noise monitoring from 5:00 pm Friday 26th June to 7:30 am Monday 29th June 2020 is not relevant as this does not cover the time of the proposed childcare at all. The centre is only proposed to operate from 8.30 am-4.00pm, Monday to Friday.

Hence the existing background noise at units 4/2 and 5/2 Worrobyl Street has not been assessed. Due to the location of units 4 and 5 which are acoustically shielded from most road traffic noise, the best estimated would be for a level similar to the ground floor measurements made by Wilkinson Murray i.e., 39 dBA (LAF90,RBL) giving a noise goal (LAeq,15 minute) of 44 dBA. The 5 dB correction that Wilkinson Murray added to the initial ground floor backyard background noise measurement to establish the upper level rated background level (RBL) is not justified.

RWDI Response: We acknowledge that the additional noise monitoring conducted at the backyard ground floor (L02) and rear balcony (L03) between 26 and 29 June 2020 did not occur during periods within the proposed operating hours of the childcare centre.

However, the purpose of this additional monitoring was to determine the difference in rated background level (RBL) between the ground floors and upper floors of the residential receivers at the rear of the site due to technical issues experienced at the L03 location during the initial 15 June to 24 June 2020 monitoring period. Given this purpose for the additional monitoring (i.e. to determine the difference in RBL between the ground floors and upper floors at the rear of the site), the fact that the additional monitoring was not conducted during the proposed operating hours of the childcare centre is not a critical factor.

The results of the additional monitoring revealed that the RBL at L03 was consistently 5dB higher than the RBL measured at L02 during the daytime period (7am-6pm). This was likely due to the ground floor area being more shielded from traffic noise along Bangaroo Street and from distant traffic noise along Frenchs Forest Road compared to the first floor balcony as discussed in section 3.1 of the WM report. Based on these findings, the 5dB correction that was added to the initial L02 RBL to establish the RBL for L03 (44 dBA L_{A90}) in the WM report can be reasonably justified, and as such the RBL of 44 dBA L_{A90} is an appropriate level to use for the upper levels of the 2 Worrobyl Street receiver for assessment purposes. This would then correspond to a daytime RBL + 5 dB noise emission criterion of 49 dBA.

2.4 Noise Sensitive Receivers

NSS Comment: Table 5-3 in the Wilkinson Murray report Version B provides an operational scenario for 8 children playing outdoors. Table 4-5 in the Wilkinson Murray report Version C provides much lower predicted noise levels without any explanation of why the predictions



have been reduced. For 14 B Bangaroo Street, ground floor, for example a 1 dB exceedance is predicted in Version B whereas in Version C the noise criterion is just met.

RWDI Response: We only have access to the noise modelling that produced the predicted noise levels for the Version C report but were not able to review the noise modelling that was undertaken for the Version B report. As a result, we unfortunately cannot provide a response as to why the predicted noise levels in the Version B report vary from the predicted levels in the Version C report.

In any case, the differences in the predicted noise levels between the Version B and C reports do not affect the outcome of the assessment as the Proponent proposes to limit outdoor play to no more than 4 hours per day, which will permit a higher noise emission criteria for outdoor play (RBL + 10 dBA) as is consistent with the Australasian Acoustical Consultants guideline (discussed in further detail later in this memorandum).

NSS Comment: *86 dBA is the sound power level stated by Wilkinson Murray for 10 children (it is noted that the Association of Australasian Acoustical Consultants (AAAC) give 87 dBA for 10 children in the 3 to 5 age group. Hence, Wilkinson Murray is correct using 86 dBA for the 8 children (from $86 = 87 - 10 \log_{10} (10/8)$).*

RWDI Response: We wish to clarify that the WM report adopted a sound power level (SWL) of 86 dBA for 10 children aged 3 to 5 years playing. This was then corrected to a SWL of 85 dBA for 8 children playing ($85 = 86 - 10 \log_{10} (10/8)$). However, for the purposes of consistency with the NSS peer review, all predicted noise levels presented in this response memorandum will be based on a SWL of 86 dBA for 8 children aged 3 to 5 years playing which agrees with the AAAC guideline data.

NSS Comment: *Only two levels are considered for 2 Worrobil Street whereas there are three levels plus a ground floor garage area. Hence there are three levels and unit 4 is effectively at a height of a fourth level. Wilkinson Murray failed to take this into account at all.*

The elevation of the outdoor play area is 60 metres, whereas the elevation on the ground below Unit 4/2 Worrobil Street is 62 metres. Units 4 and 5 are built at an elevation equivalent to four-storeys (or more) above the ground. Due to the high elevation of the neighbouring properties to the north and west (particularly Unit 4/2 Worrobil Street - over 8 metres) there is a direct line-of-sight to the proposed outdoor play area, even if a 3 metre high barrier is constructed at the rear of the proposed outdoor play area. These elevations appear to have not been taken into account in the Wilkinson Murray noise model.

*Based on a distance of 18 metres (hypotenuse) from the outdoor area of Unit 4/2 Worrobil Street to the centre of the play area the predicted noise level (LAeq,15 minute) is **53 dBA** ... This exceeds the 44 dBA noise goal by 9 dB. Even if the background level at Unit 4/2 Worrobil*



Street is the 44 dBA and goal is 49 dBA (as assumed by Wilkinson Murray) there is still an exceedance of 4 dB.

RWDI Response: We note that our SoundPLAN modelling has considered the topography of the site based on elevation contours obtained from the ELVIS (Elevation Information System) online database. Our review of the noise modelling that produced the predicted noise levels in the Version C report reveal that the receiver location in the model chosen to represent the upper floors of 2 Worrobil Street was at a lower elevation than the actual elevation of units 4 and 5 of 2 Worrobil Street. After correcting the elevation of the receiver location in the model to be 7.5m above the ground level where units 4 and 5 are situated, we predict a noise level from the outdoor play of **52 dBA $L_{Aeq, 15min}$** , which is relatively consistent with NSS's predicted noise level. This is a 3 dB exceedance of the 49 dBA noise emission criteria for unrestricted outdoor play (as discussed in our response to section 2.3 of the NSS peer review, we believe that a "background noise + 5 dB" criterion of 49 dBA for the upper floors of these receivers is justified, based on an RBL of 44 dBA).

Section 3.2.1 of the AAAC's Guideline for Child Care Centre Acoustic Assessment (version 3.0, dated September 2020) states that if outdoor play is limited to no more than 4 hours total per day – no more than 2 hours in the morning and 2 hours in the afternoon – then the $L_{eq, 15min}$ noise level emitted from outdoor play should not exceed the RBL by more than 10 dB. The Proponent has agreed to limit outdoor play to no more than 4 hours as is consistent with the AAAC guideline, and so the noise emission criterion for outdoor play noise is **54 dBA $L_{Aeq, 15min}$** for the upper floors of receivers R01-R04, and **49 dBA $L_{Aeq, 15min}$** for the ground floors of receivers R01-R04. Based on this, our revised predicted noise level (52 dBA) and the NSS predicted noise level (53 dBA) both comply with the "background noise + 10 dB" criterion of 54dBA.

NSS Comment: *Due to the high elevation of Unit 2/2 Worrobil Street (over 6 metres) there is a partial direct line-of-sight to the proposed outdoor play area, even if a 3 metre high barrier is constructed at the rear of the proposed outdoor play area. Based on a distance of 22 metres (hypotenuse) from the outdoor area of Unit 2/2 Worrobil Street to the centre of the play area the predicted noise level ($L_{Aeq, 15 \text{ minute}}$) is 46 dBA from $(46 = 86 - 20 \log_{10}(22) - 10 \log_{10}(2\pi) - 5)$. Where the 5 dB is the limited barrier reduction. This exceeds the 44 dBA by 2 dB.*

RWDI Response: We do not dispute NSS's predicted noise level of 46 dBA at unit 2/2 Worrobil Street. We note this predicted noise level complies with the revised "background + 10 dB" criterion of 54 dBA for the upper floor receiver locations.

NSS Comment: *The 2.4 metre barrier, as recommended by Wilkinson Murray, between the site and the northern neighbour - 18 Bangaroo Street will not total exclude the line-of-sight to the boundary position due to the 2 metre difference in elevations. The predicted noise level*



($L_{Aeq,15\text{ minute}}$) here is 55 dBA from $(55 = 86 - 20 \log_{10}(8) - 10 \log_{10}(2\pi) - 5)$ where the 5 dB is the limited barrier reduction.

RWDI Response: The NSS calculation indicates that the distance between the outdoor play area and the receiver location is 8m. This suggests that NSS is assessing to the ground floor area of 18 Bangaroo Street. A review of our noise model indicates that difference in elevation between the site and 18 Bangaroo Street had not been fully accounted for. After correcting the elevation of the ground floor receiver location in the model, it is expected that the 2.4m high barrier between the site and 18 Bangaroo Street will still break line of sight between the outdoor play area and the ground floor area of 18 Bangaroo Street. We predict that the noise level at the ground floor of 18 Bangaroo Street will be **49 dBA $L_{Aeq,15\text{min}}$** , which is compliant with the 49 dBA criteria for ground floor receiver areas.

The first floor windows of 18 Bangaroo Street are further away from the outdoor play area (approximately 15m) and are partially shielded from the outdoor play area. Our modelling indicates that the predicted noise level at the first floor of 18 Bangaroo Street will be **51 dBA $L_{Aeq,15\text{min}}$** , which is compliant with the 54 dBA criteria for the upper floor receiver areas.

NSS Comment: *Wilkinson Murray have not suggested sound absorbing panels and hence all sides of the outdoor play area will be sound reflecting. This is not an issue if, at least, one boundaries of the outdoor play area faces a non-sensitive area such as bushland or a reserve where the noise can be projected. In this case the reflected noise will be directed upwards towards the neighbouring apartment premises at 2 Worrobyl Street.*

RWDI Response: The noise modelling has assumed hard, sound reflective surfaces for all sides of the outdoor play area. The predicted noise levels at the neighbouring receivers include contributions from noise reflecting off these hard surfaces bounding the outdoor play area.

3 Summary and Conclusions

NSS Comment: *After peer reviewing the two reports, we find that the reports have not fully taken into account the noise from the outdoor play areas, particularly the residential receivers, in the elevated six units at 2 Worrobyl Street.*

The proposed noise barriers up to 3 metres high in residential gardens would not generally be acceptable to neighbours. Even so, it is our view that the barriers are not high enough to meet the noise goals of background noise plus 5 dB. Hence, we conclude that the proposed site is totally unsuitable for use as a childcare centre.



RWDI Response: We are of the opinion that noise impacts have been assessed at the potentially most affected residential units at 2 Worrobyl Street as part of this response and found to be compliant with the AAAC's "background noise + 10 dB" criteria. Based on this, it can be reasonably concluded that noise impacts will be compliant at all receivers within residential complex at 2 Worrobyl Street.

As discussed earlier in this response memorandum, the Proponent has agreed to limit outdoor play to no more than 4 hours total per day – no more than 2 hours in the morning and 2 hours in the afternoon. This permits a noise criterion for outdoor play of "background noise + 10 dB" in line with the AAAC's guidelines. This memorandum has demonstrated that the proposed use is capable of complying with this revised criterion, and as such the development application for the proposed childcare centre can be supported with respect to acoustics.

Feel free to contact us if you have any questions.

Sincerely,

RWDI

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