

# Sound Advice

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1<sup>st</sup> October 2018

Dear Lindsay,

**Ref: Noise intrusion assessment for proposed play deck at St. Kentigern's School, Newton Drive, Blackpool.**

Thank you for the information regarding this site and advice about the requirement for a Noise Assessment.

As I understand it, the new play deck will cater for about 1/3<sup>rd</sup> of the children requiring the open play space and will be used for just 20 minutes a time in any given hour, at slightly varying times due to circumstances, but basically from 10:40 until 13:15 approximately.

There will be a 3m high fence around the play area and this will be enhanced by a form of "green wall" solid construction to 2m high to soften the visual impact.

There are existing dwellings on Bryan Road to the rear of the school with back gardens/yards facing north towards the area of the proposed play deck and it has been suggested that the level of noise created by the use of the new development may be detrimental to the current residents.

## **Technical Background and Guidance:**

1. The target for acceptable noise levels in the daytime (from 7am) in living rooms is recommended by the World Health Organisation (WHO) as 35dB(A). However, BS8233 suggests that for "good" conditions a level of 30dB(A) is better. This is also seen to be a better target for bedrooms.
2. The WHO target for acceptable noise levels in amenity areas is 50dB(A) (1hr average). This is the recommended noise level to avoid "moderate community annoyance". A value of 45dB(A) has historically been considered as the level below which noise need not be considered an issue when determining Planning Permission for new dwellings.

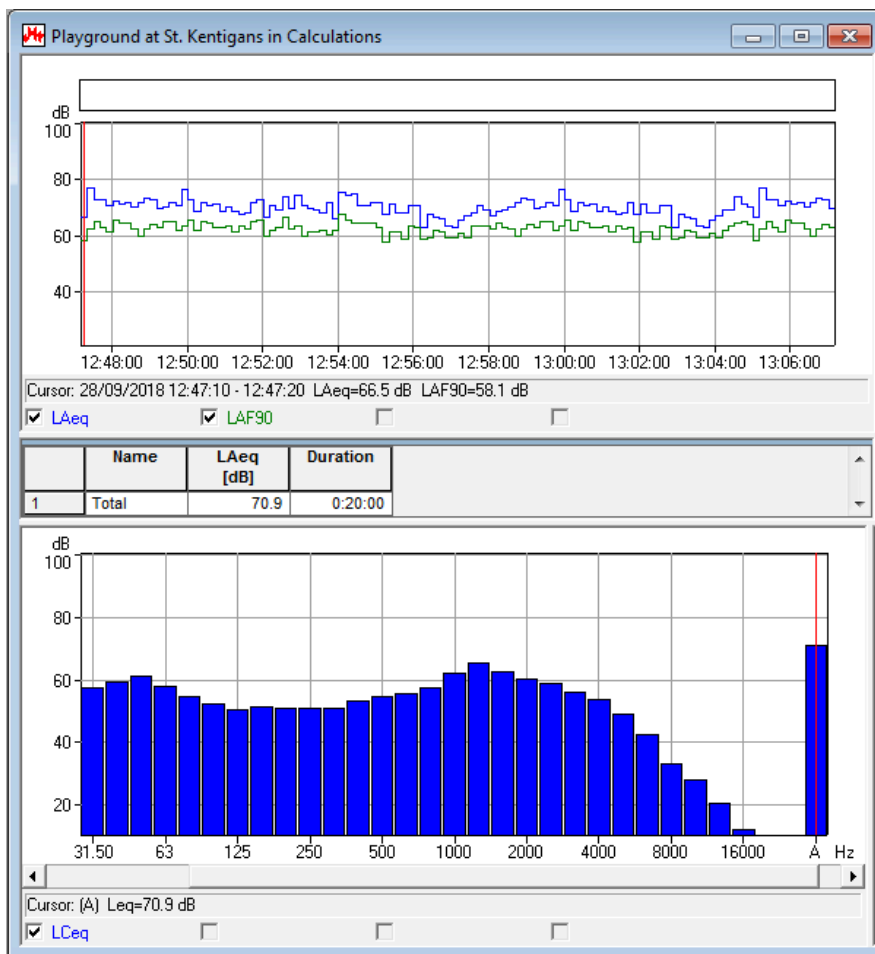
## **Measuring Equipment:**

The noise measurements were taken using a Bruel & Kjaer Type 2260 'Investigator' Precision Sound Level Analyser equipped with the BZ7206 Environmental Acoustics software. The system was calibrated before and after the measurements using a Bruel & Kjaer 4231 Class 1 Acoustic Calibrator. The equipment accuracy is traceable to UKAS.

## Noise measurement:

An automatic logged (10 sec) measurement of the typical noise created in the existing playground was carried out on Friday 28<sup>th</sup> September by placing the sound level meter in the current playground with the full complement of children active. The weather was benign with partial sun and no wind.

The logged measurement in terms of LAeq (blue - energy average) and LAF90 (green - background level) is shown below along with a calculation of the overall average level and a frequency analysis of the noise in dB(C) terms. All noise levels in this assessment are rounded to the nearest dB in line with standard procedure.



Several things emerge from looking at this data:

1. The noise of the children is variable as would be expected but is remarkably consistent over quite a narrow range. The closeness of the graphs of the two LAeq and LAF90 parameters confirms this. The average level over 20 minutes was 71dB(A).
2. The frequency analysis of the noise indicates that the majority of the energy is in the middle to high frequencies around 1 to 2 kHz and above. This again would be expected with very young voices. The lower frequency raised area on the frequency graph is due to distant traffic noise and has no effect on the overall dB(A) value.

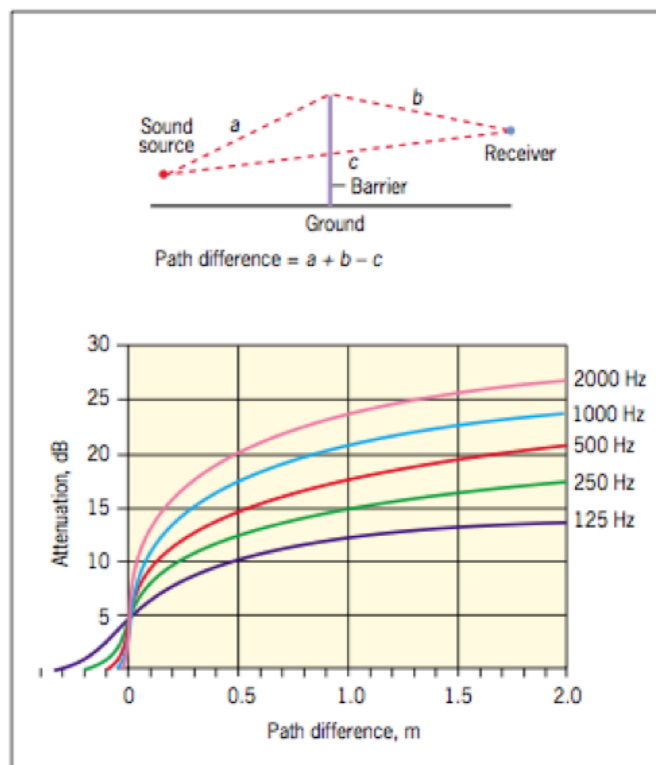
## Noise calculations:

1. The noise level measured is based on the total compliment of children at play. The proposed deck will only accommodate 1/3<sup>rd</sup> of this amount of children. Therefore, the noise will be reduced accordingly. Noise levels are logarithmic. So the number of dB's does not reduce by 2/3<sup>rd</sup> from 71dB(A) to 47dB(A) but only by about 5dB to **66dB(A)**
2. This noise level is based on the centre of the playground area but could be deemed to be anywhere due to the random spread of the children around the area. Therefore, this 66dB(A) can be taken as the source noise level for the proposed play deck at a position at the centre of the play deck.

3. Noise reduces with distance according to the expression:

Noise at X = Noise at Y – 20 log X/Y in dB. X and Y are distances in metres.

4. The back wall of the proposed play deck is about 16m from the rear windows of the houses on Bryan Road. The centre of the play deck is also about 16m from the centre of the rear gardens. This implies a direct line-of-sight noise reduction of  $20\log 16 = 24\text{dB}$ . Thus, reducing the likely noise impact to  $66 - 24 = \mathbf{42\text{dB(A)}}$ .
5. The WHO and BS guidance on noise in the daytime is normally based on hourly averages. Therefore, if the play deck noise is only present for 20 minutes then the hourly effect is reduced further by 5dB to **37dB(A)**.
6. Most importantly, the proposed play deck is to be surrounded by a solid fence. Noise is reduced by barriers in accordance with the diagram inset below. The noise must travel over the barrier rather than directly and this creates a Path Difference. The effect is frequency dependent.



### Noise calculations (continued):

7. If we assume a typical child height of 1m, source noise in the centre of the play deck at 2m from the barrier, a solid barrier height of 2m and a distance to the dwelling garden of a further 14m, then a simple application of Pythagoras's Theorem yields a Path Difference of around 0.6m. In actual fact, the garden area is below the play deck height and the Path Difference will be slightly greater, but this is of little significance to the overall calculation.
8. From the graph in the diagram above, we can clearly deduce that at the typical frequencies of children's voices (1 to 2kHz and above), the likely noise reduction will be at least 17dB at 1kHz and much more at the higher frequencies.
9. Therefore, the likely hourly average overall noise impinging on the nearest dwelling to the rear would be around  $37 - 17 = 20\text{dB(A)}$ .

### Conclusions:

1. An average noise level of 20dB(A) is below the WHO recommendations for inside dwellings even without taking into consideration the reduction of the windows.
2. An average noise level of 20dB(A) is below any consideration of noise as a potential nuisance issue in amenity areas.

I trust that this clarifies the position and helps you to progress the development. Please call me if you think that I can assist further.

Best regards,

*John Houldsworth*

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