



Client: Mr Shane Beauchamp

Site: Background Noise - 208 London Road, Waterlooville, Hampshire, PO7 7AN
Source Noise – Woodberry Day Nursery, 231 Botley Road, Southampton, Hampshire,
SO19 0NL

Date: BGN – 31st May 2016
SOURCE NOISE – 12th December 2017

Project: To determine the impact of a children's nursery on the neighbouring dwellings to
208 London Road, Waterlooville.

Written by: Mr Michael D Vine ~ BSc Hons, MIOA

Introduction:

Airtight & Noisecheck Ltd were instructed by Mr Shane Beauchamp to undertake a Noise Impact Assessment at Woodberry Day Nursery Ltd and compare the noise levels associated with children playing in the garden to the background noise levels measured at 208 London Road, Waterlooville to determine the impact such a nursery would have on this address.

A planning application has been made to convert the current dwelling at 208 London Road, Waterlooville into a day nursery for 75 children. The hours of operation will be 0730-1800hrs Monday to Friday. The children will have access to the garden area but the time spent outside time will vary throughout the day time period and will probably only last for 30minutes at any one time.

The proposed nursery will have 75 children in attendance, which is the same number of children at Woodberry Day Nursery.

The noise levels were measured for a typical reference period of 1hour between 1016-1116 on the 12th December 2017. The microphone was positioned in the garden of the nursery and the measurement encompassed the children being outside. These levels will be compared to the background noise levels at the residential boundary of 208 London Road. The background levels were measured as part of the previous assessment in Mya 2016.

Equipment used:

Nor121 Environmental Analyser – Serial No 29809, Calibration due July 2018.

Analyser complies with the following standards:

- IEC 60651 type 1
- IEC 60804 type 1
- IEC 61260 class 1
- IEC 225
- ANSI S1.4-1985 type 1
- ANSI S1.43-1997 type 1
- ANSI S1.11-1986 order 3 type1 D
- DIN 45 657
- Norsonic production standard set for the Nor121

Measurement Microphone (Gras 40AF) - Serial No 51465. Calibration due September 2018.

Acoustic Calibrator – Class 1 (Nor 1251) – Serial No 31652, Cal due September 2018

Site Description:

208 London Road is a detached dwelling located immediately to the East of London Road. There are existing dwellings located to the North, South & East with the road located to the West. The garden is located to the East of the building at the rear of the site.

The centre of the closest garden is circa 15m to the North & South so this is the distance that has been used for the barrier calculations.

Woodberry Day nursery is a large detached building located at 231 Botley Road, Southampton. It is similar in size to the proposed nursery and holds the same number of children. The garden is also located to the rear and the roads are similar in size and capacity with volume of traffic therefore the noise levels associated with the 2 sites will be very similar.

Background Noise Levels:

The noise levels were measured between 1130-0430 on 31st May 2016, this time period encapsulates the majority of the opening hours of the nursery (the early morning noise levels were not measured due to an equipment malfunction) and inspection of the results indicate a noise climate that is very similar throughout the while day time period. This is due to the road traffic using London Road which is located immediately to the West of the building. The site is exposed to relatively high levels of road traffic.

Time Period	1130-1230	1230-1330	1330-1430	1430-1530	1530-1630	1630-1730	1730-1830
L _{Aeq} 1hour	57dBA	57dBA	56dBA	57dBA	57dBA	57dBA	56dBA

It is clear to see that the L_{Aeq} values are very similar throughout the whole day time period and they do not vary thus indicating a constant noise source apparent.

For comparison purposes the source noise will be compared with the lowest LAeq 1hour value during the hours of operation. Detailed frequency analysis and barrier corrections are shown later in the report.

Source Noise:

The source noise was measured for a 1hour reference period whilst the children were in the garden. The 5min values were measured to show the difference between when the children are in the garden and not, also to show the reduction to be applied to the 1hour value to take into account that the children will not be in the garden for more than 30minutes in any one hour period.

Time Period	1015-1020	1020-1025	1025-1030	1030-1035	1035-1040	1040-1045	1045-1050	1050-1055	1055-1100	1100-1105	1105-1110	1110-1115
LAeq 5mins	65dB	66dB	62dB	63dB	61dBA	48dBA	47dBA	42dBA	43dBA	42dBA	41dBA	40dBA

It is clear to see that the children are only outside for circa 30minutes at a time therefore the noise levels are reduced greatly when they are not in the garden. It is also clear to see that whilst the children are outside the noise levels are higher than the background noise levels, however, there will be sound reduction values to be applied to the levels to take into account:

1. Barriers (boundary fences)
2. Distances to receptor location
3. Reduction applied due to the fact the noise isn't constant for the whole 1hour period

The level of 66dBA has been used as the source noise as this is the highest LAeq value during the time the children were outside. This value is +10dB above the lowest background LAeq value at the proposed site, however the following corrections must be applied to the noise levels.

The following corrections can be applied for the points listed above:

Barriers:

The following calculation shows the predicted sound reduction based on a barrier between the source and receiver. For the purposes of the calculation the distance from the source to the barrier is 7.5m (centre of garden) and the distance from the receptor & barrier is 7.5m, the height of the barrier is 2m and the height of the source and receptors is 1m.

Path Diff

0.12

Hz

Attenuation (dB)

63	125	250	500	1000	2000	4000	8000
5.9	6.8	8.1	10.0	12.3	14.9	17.7	20.6

Source Noise

Source + Barrier

58.2	54.5	50.4	58.5	64.8	54.7	50.2	38.9	67.1
52.3	47.7	42.3	48.5	52.5	39.8	32.5	18.3	57.1

Barrier Attenuation

10.1

The frequency values used in the calculation above have been taken directly from the noise levels measured at Woodberry Day Nursery.

It is clear to see that the barrier should offer a sound reduction of -10dB which is a fair assumption.

Distance to Receptors:

Noise will decay over distance for obvious reasons, using a point source equation the noise should decay by circa -18dBA using a source distance of 2m and a receptor distance of 15m. Therefore, the source noise would be far less at the centre of the neighbouring gardens.

Reduction due to the fact that the noise is not constant for the entire 1hour period:

Due to the noise only being apparent for circa 30minutes in any one hour, a sound reduction must be applied to the figures to take the reduced levels into account. It is clear that the children are only outside for circa 30minutes in any 1hour period. The required levels of reduction can be calculated using the following equation:

$$10\log (\text{duration of event/duration of reference period}) \text{ in seconds}$$

Using this equation a -3dB reduction can be applied to the rating level to take into account that the noise is only in operation for 30minutes in any one hour.

Calculated Value in neighbouring Gardens:

The following table shows the calculated level of the noise associated with the children playing outside, taking into account the acoustic feature corrections above. In addition, the calculated levels will be compared to the recommended noise levels in amenity space as listed in BS8233: 2014 which states:

*For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. **However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.***

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.

Measured Level	Reduction due to barrier	Reduction due to duration	BGN level	Calculated Level	Difference	BS8233: 2014 level	Criteria Achieved
66dBA LAeq	-10dB	-3dB	56dBA	53dBA	-3dB	50-55dB	Yes

This table shows that the noise associated with the children should not have an adverse impact on the neighbouring dwellings as it is below the current noise level apparent on site (all day) and it also does not take into account the sound reduction due to noise decay over distance. In addition, the calculated levels are within the recommended external amenity space for gardens as listed on BS8233: 2014.

Frequency Analysis:

The table below shows the linear frequency values of when the children are playing in the garden compared to the background noise levels. Please note this table does not include any of the acoustic feature corrections that should be applied to the source noise levels.

Frequencies	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Source noise	58.2	54.5	50.4	58.5	64.8	54.7	50.2	38.9
BGN	63.8	56.6	51.3	50.5	53.6	47.8	45.4	32.6
Difference	-5.6	-2.1	-0.9	8	11.2	6.9	4.8	6.3

It can be seen that the lower frequencies (which would be more of a nuisance) are below the existing noise levels. Although the high frequencies are above the existing levels, the acoustic feature corrections have not been applied to these figures. Also the type of noise must be taken into account, it is highly unlikely that the noise associated with children playing in a garden will be deemed a nuisance.

Conclusion:

Based on all of the measured data and the correction that must be applied to the levels it is clear that the proposed use of 208 London Road as a day nursery will not have an adverse impact on the neighbouring dwellings. The calculated levels will be less than the current noise levels at the site and the calculated levels meet the requirements for amenity space as listed on BS8233: 2014. The nursery will not be open during noise sensitive hours so it will not cause sleep disturbance nor will the children be outside very early in the morning or late in the afternoon.

All of the calculations indicate that the noise should not have an adverse impact on the site nor should it affect the current acoustic criteria apparent.

The noise must also be taken into context as it is not a noise that should pose a nuisance and it is clear that the children will not be in the gardens for long periods of time, but for periods of 30minutes throughout the day time period.