



24Acoustics

Armstrong House
3 Bassett Avenue
Southampton
SO16 7DP

T: 02381 555000
E: info@24acoustics.co.uk

**OAK CARE HOME
EMSWORTH
PLANT NOISE IMPACT ASSESSMENT**

Technical Report: R7861-1 Rev 0

Date: 5th April 2019

For: Oak Care Home
46 New Brighton Road
Emsworth
PO10 7QR

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	Name	Position	Signature	Date
Prepared by	Neil McLeod BA(Hons) MIOA	Senior Consultant		05/04/2019
Reviewed by	Chris McConnell BSc MSc MIOA	Senior Consultant		05/04/2019
Approved by	Stephen Gosling BEng MIOA	Principal Consultant		05/04/2019
For and on behalf of 24 Acoustics Ltd				

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0	Approved for Issue	Neil McLeod	Chris McConnell	Stephen Gosling

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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been appointed to undertake an assessment of the potential noise impact from new building services plant at the Oak Care Home, Emsworth. The new plant is operational and comprises kitchen and laundry ventilation systems. This noise impact assessment has included:
- Environmental noise monitoring
 - Plant noise measurements
 - Noise limits for new plant on the site
 - Assessment of noise from the new plant
- 1.2 This report presents the results of the assessment following site visits and an environmental noise survey undertaken between 20th and 26th March 2019.
- 1.3 All sound pressure levels quoted in this report are in dB relative to 20 μ Pa. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

- 2.1 Oak Care Home is located in a residential area in Emsworth, near Havant. The east of the property bounds New Brighton Road, which is a single carriageway. The other façades of the property face neighbouring residential properties and gardens.
- 2.2 The nearest residential property (No. 44 New Brighton Road) is located to the south of the property. The nearest window to No. 44 is approximately 12 metres from the new rooftop plant and acoustically screened by the roof edge. No. 8 Silvertrees to the north east was also identified an affected residence, with partial site of the roof-top plant at a distance of 38 metres.
- 2.3 Numbers 9 and 10 Silvertrees are significantly screened from all plant and lower noise levels would be expected at these properties. All adjacent properties are acoustically screened from the ground floor kitchen supply fan by the new building.
- 2.4 Local road traffic is the dominant source of noise at the nearest residential properties. Figure 1 describes the site plan and the location of the new plant in relation to adjacent properties.

3.0 CRITERIA

Planning Conditions

- 3.1 Planning permission was granted for a rear extension and new plant, following appeal, in March 2014. Planning Condition 4 (reference: APP/18/01124) states:

"No externally visible or audible plant, machinery or structures required for ventilation or filtration purposes shall be installed until details of the external appearance and acoustic performance have been submitted to and approved in writing by the local planning authority. Development shall be carried out in accordance with the approved details and retained thereafter."

- 3.2 Planning Condition 5 states:

"Noise resulting from the use of any/all plant, machinery or equipment on the site shall not exceed a level of 5dB(A) below the existing background level (or 10dB(A) below if there is a particular tonal quality) when measured according to British Standard BS4142-1997."

- 3.3 BS 4142:1997 was superseded in 2014, as described in the following section.

BS 4142:2014 Methods for Rating Industrial and Commercial Sound

- 3.4 BS 4142:2014 [Reference 1] provides a method for rating the effects of industrial and commercial sound on residential areas.
- 3.5 The standard advocates a comparison between the representative measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction should be applied.
- 3.6 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact, also depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

4.0 ENVIRONMENTAL NOISE SURVEY

Background Noise Measurements

- 4.1 An environmental noise survey was undertaken between 20th and 26th March 2019 to determine the prevailing background noise levels at the site and nearby noise sensitive properties.
- 4.2 Noise monitoring equipment was set up to the rear of the Oak Care Home, on the northern perimeter of the garden at a height of approximately 1.5 metres and approximately 1.5 metres from the boundary wall. This location is considered representative of the background noise conditions at the residential windows most affected by the new plant. The survey location is shown in Figure 1.
- 4.3 The following equipment was used during the survey:
- Rion precision sound level meter Type NL-32
 - Norsonic acoustic calibrator Type 1252
- 4.4 Noise measurements were undertaken in samples of 5 minutes in terms of the overall A-weighted L_{eq} , L_{90} and $L_{max,f}$ noise levels. Measurements were made in accordance with BS 7445:1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 2].
- 4.5 The instrumentation's calibration was checked before and after the survey in accordance with the manufacturers' instructions. No significant drift in calibration was recorded. Calibration of 24 Acoustics' equipment is traceable to National Standards. All instruments were fitted with environmental weather shields during the surveys.
- 4.6 Weather conditions during the site visits were fine and dry. Wind speeds were typically lower than 5 m/s.
- 4.7 The results of the ambient noise survey are shown graphically in Appendix B and summarised in Table 1 for the plant operational periods (07:30 to 17:30 hours).

Date (March 2019)	Typical Background Noise Level, dB LA90, 1 hour During Operational Hours (07:30 to 17:30 hours)
Wed 20 th	45
Thu 21 st	41
Fri 22 nd	45
Sat 23 rd	39
Sun 24 th	39
Mon 26 th	38
Tue 27 th	39
Typical Value	38

Table 1: Summary of Measured Background Noise Levels.

4.8 In accordance with Planning Condition 5, noise from the new plant should not exceed the following level at the most affected residential properties:

- 33 dB LAeq, 1hr during operational hours (07:30 to 17:30 hours)

4.9 If noise from the plant exhibits a tonal component that is noticeable at the affected property then the above value will decrease by 5 dBA.

Plant Noise Measurements

4.10 The plant installed under planning application APP/18/01124 comprises the following units:

- Roof mounted external kitchen extract fan
- Internal laundry supply fan (ducted to roof)
- Internal laundry exhaust fan (ducted to roof)
- Ground floor external kitchen supply fan

4.11 The kitchen ventilation system operates daily between 07:30 and 17:30 hours and the laundry ventilation system operates daily between 08:00 and 13:30 hours.

4.12 Manufacturer's noise data was not available for the equipment so detailed plant noise measurements were undertaken by 24 Acoustics on 20th March 2019. The results are summarised in Table 2.

Plant Item	Measurement Location	Measured Noise Level, dB $L_{Aeq, T}$
Kitchen Supply	1m from grille, off-axis	53
Kitchen Extract	1m from grille, off-axis	64
Laundry Supply	1m from grille, off-axis	62
Kitchen and Laundry	1m from plant to south	62
Ambient/residual	Roof level	49

Table 2: Plant Noise Measurements.

- 4.13 Each item of plant was operating at the standard required duty during the measurements, as confirmed by the building manager. The plant did not exhibit a subjective tone or other distinctive characteristic at the above measurement locations.

5.0 PLANT NOISE ASSESSMENT

- 5.1 With corrections for attenuation and distance, as required, calculations have been undertaken to determine plant noise levels at the identified receptors, as described in Table 3.

Receptor	Plant Noise Level, dB $L_{Aeq, 1hr}$
44 New Brighton Road	32
8 Silvertrees	33
Plant Noise Criterion	33

Table 3: Predicted Plant Noise Levels

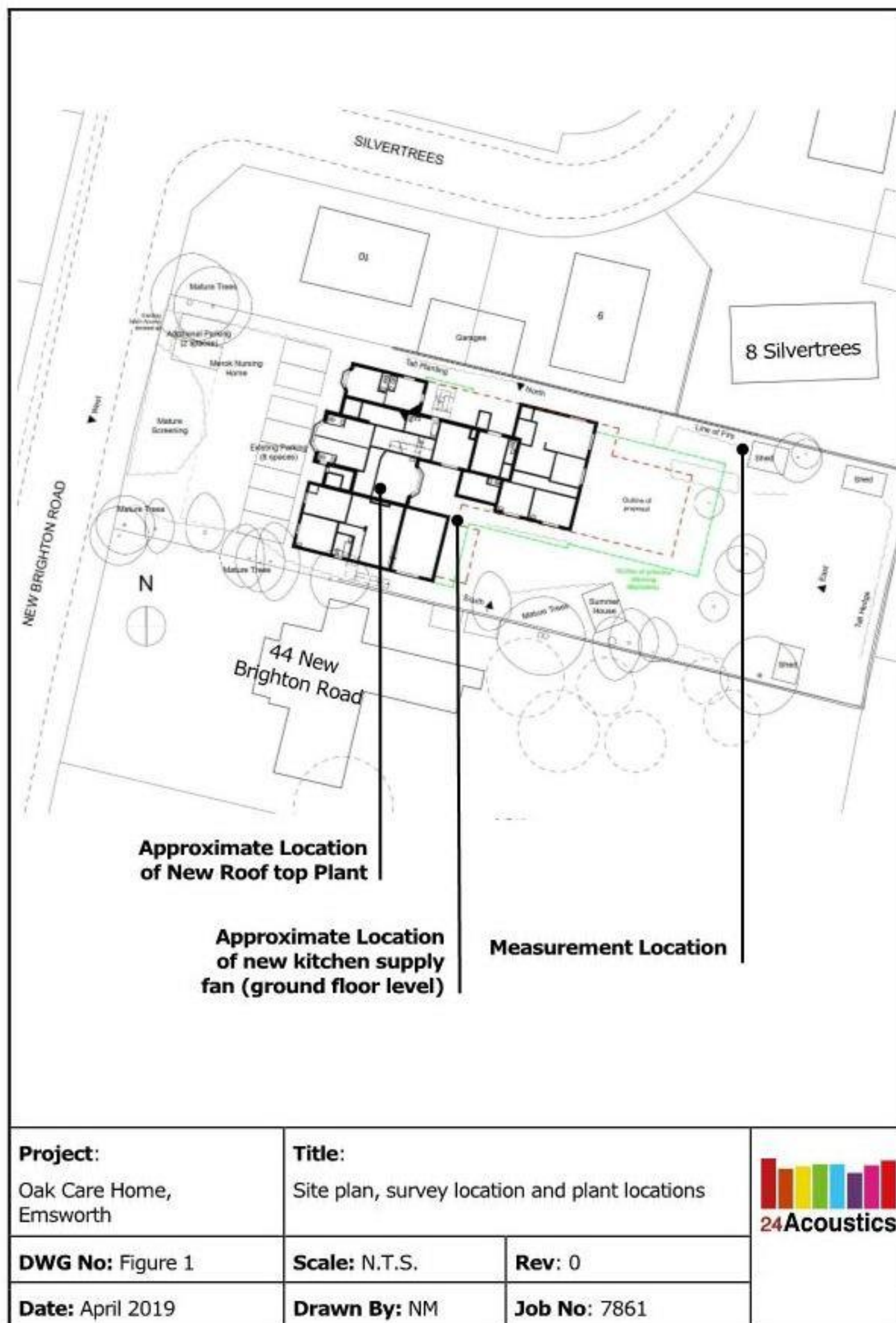
- 5.2 The calculations demonstrate that noise levels from the new plant at the most affected residential windows would be at least 5 dB below the background noise level during the operational periods, which is in line with planning condition 5 and hence acceptable.

6.0 CONCLUSIONS

- 6.1 24 Acoustics Ltd has been instructed by Oak Care Home to undertake a noise impact assessment for new plant at the Oak Care Home, Emsworth.
- 6.2 A noise survey has been undertaken at the site to determine the prevailing background noise levels during the plant operational periods. Noise measurements have also been undertaken to determine the levels produced by the plant during normal operation.
- 6.3 Calculations have determined that noise from the plant would be at least 5 dB below the typical background noise level as assessed outside the most affected residential windows. The new plant therefore complies with planning condition 5 and is acceptable.

REFERENCES

1. British Standards Institution. British Standard 4142. Methods for Rating Industrial and Commercial Sound, 2014.
2. British Standards Institution. British Standard 7445:1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use, 1991.



APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T , has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B – ENVIRONMENTAL NOISE MEASUREMENTS

**Background Noise Measurements: Oak Care Home, Emsworth
20th to 26th April 2019**