AIRTIGHT & NOISECHECK LIMITED

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ACOUSTIC TESTING REPORT FOR

D&K CONTRACTING SERVICES LTD
44 THE HUNDRED
ROMSEY
HAMPSHIRE
SO51 8BX

SITE ADDRESS

LAND ADJACENT TO BENHALL
HAMBLEDON ROAD
WATERLOOVILLE
HAMPSHIRE
PO7 6XB

Acoustic Engineer: **Date: 2-3 September 2014**

Michael Vine

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Customer Name: **Date: 2-3 September 2014**

D&K Contracting Services Ltd
44 The Hundred
Romsey
Hampshire
SO51 8BX

Site Address:

Land Adjacent to Benhall
Hambledon Road
Waterlooville
Hampshire
PO7 6XB

Acoustic Engineer:

Mr. Michael Vine

Equipment used:

Norsonic Environmental Analyser 121 – NOR121 serial No 29809, Calibration due July 2015

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
ANSI1.43 -1997 type 1
ANSI S1.11-1986 order 3type1D
DIN 45 657
Norsonic Production Standard set of the Nor121

Measurement Microphones (Gras 40AF) – Serial No 51465, Calibration due June 2015 & Nor 1225, serial No 54968, calibration due July 2015

Acoustic Calibrator (Nor 1251) - serial no 31652 - Calibration due June 2015

Measurement Procedure:

The external ambient noise levels were recorded in 2 x microphone locations, measurements were recorded in single octaves for a 24hour period at the Northeast & Southeast approximate facades of the proposed development between 1530hrs on 2nd September 2014 to 1530hrs on 3rd September 2014 to ascertain the external noise levels for proposed residential development at the proposed site address. This report will be written according to the requirements of World Health Organisation – guidelines for community noise. Other British Standards and documents may be referred to in this report. Due to equipment malfunction the noise levels between 1030-1530 on the 3rd September were not recorded, however levels have been assumed using the remaining data and the consistent noise sources apparent at the site.

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Executive Summary:

Airtight & Noisecheck Ltd were instructed by D&K Contracting Services Ltd to undertake a noise impact assessment to determine the current noise levels associated with Land Adjacent to Benhall, Hambledon Road, Waterlooville, Hampshire, PO7 6XB.

A planning application is to be made to create 10 x residential dwelling – flats split over 3 floors with 4 units on the ground & first floors and a further 2 units located on the 2nd floor. The noise levels have been compared to the requirements of the World Health Organization (WHO) document – Guidelines for community noise, 2000 & BS8233, 2014.

The site is located in a mixed use area of Waterlooville, there are large numbers of existing residential dwellings located immediately to the North, East & West and a large industrial unit located approximately 30metres to the South/Southeast. The major noise sources apparent on site are:

- Vehicular traffic using the local road network - Hambledon Road located to the North/Northeast
- Industrial Units located to the South/Southeast

The noise levels were measured in 2 x locations in order to establish the necessary sound reductions required to protect the residents form the road traffic at the front of the site and the noise associated with the industrial unit located at the rear of the site. The noise levels measured indicate that a sound reduction of 30dB is required for the building elements at the front of the site and a sound reduction of 26dB is required at the rear. This level of reduction can be achieved and a suitable product has been listed in this report.

If the necessary materials are installed then there is no reason why the future residents can't enjoy a reasonable standard of living at the proposed location. There are many existing residential dwellings located in the immediate vicinity of the site and there are many more being built in the vicinity of the site.

If adequate attenuation measures are applied and careful internal planning measures are undertaken there is no reason why the future residents can't enjoy a reasonable standard of living at the proposed site. Hambledon Road is a mixed use road with many residential dwellings being built very close to the site location.

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1 **Objective:**

1.1 To determine the existing external noise levels associated with both the Southeast & Northeast facades of the site as these facades face the local road network (Northeast) and the industrial unit (Southeast) which produces the majority of the noise emissions associated with the site. The site currently comprises of a vacant piece of land. A planning application is to be made to construct a purpose built development, comprising of 10 residential dwellings, built over three floors. The purpose of this report is to adequately protect the future residents from the external noise emissions to ensure they have a satisfactory internal noise criteria.

2 **Calibration:**

2.1 The measurement microphones were calibrated before and after testing in each measurement location and there were no drifts recorded during the assessments.

3 **Site Layout & Microphone Position:**

3.1 The parcel of land is located immediately to the South/Southwest of Hambledon Road, which is a busy road running through Waterlooville. Hambledon Road is predominantly a mixed use area with a large number of residential dwellings situated on either side of the road, combined with a industrial estate located further to the South, there is also a large number of new dwellings being built along Hambledon Road.

3.2 Hampshire Cosmetics is located approximately 30metres to the South/Southeast of the proposed rear facade of the development. This company is located in a very large industrial unit with a lot of vehicles and people using the area, there is an industrial estate located beyond this building. There are existing residential dwellings located immediately to the West of the proposed site and the North of Hambledon Road.

3.3 The proposed internal layout of the accommodation can be seen at the back of this report, and the proposed building will be located at the same distance to the road as the neighbouring properties therefore they will not be closer to the road. The industrial unit and a proposed site layout plan can be seen at the rear of this report.

3.4 Two microphone locations have been used for this measurement duration, microphone one was positioned at the proposed front facade of the development facing Hambledon Road, approximately 1.5metres from ground level and in excess of 3metres from any other reflective surface. The 2nd microphone was placed at the approximate facade of the rear of the building facing Hampshire Cosmetics, again it was positioned at least 1.5metres from ground level and in excess of 3metres from any other reflective surface.

3.5 The building has yet to be erected so the measurements were taken in free field conditions. It was assumed to be a typical day with normal levels of traffic using the roads and Hampshire Cosmetics were in operation during the measurement procedures.

4 **Weather Conditions:**

4.1 The weather was pleasant during the measurement procedure and each day was very sunny. The temperatures ranged between 5-20degrees Celsius.

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5 **Results:**

5.1 The measured noise levels for the microphone location is listed in the table below.

Microphone Location One (Front of site - External):

Time Period	**LAeq**	**To Satisfy WHO Requirements**	**LAFMax 1hour**	**LAFMax Reduction needed (WHO)**
Day – 0700-2300 2/9/14	60dB(A)	25dB(A)	N/A	N/A
Night – 2300-0700 2&3/9/14	53dB(A)	23dB(A)	75dB(A)	30dB(A)

Microphone Location Two (Rear of site - External):

Time Period	**LAeq**	**To Satisfy WHO Requirements**	**LAFMax** 5min	**LAFMax Reduction needed (WHO)**
Day – 0700-2300 2/9/14	56dB(A)	21dB(A)	N/A	N/A
Night – 2300-0700 2&3/9/14	49dB(A)	19dB(A)	71dB(A)	26dB(A)

5.2 The minimum reductions needed by the building materials and specifications is 30dB(A) for the front of the site and 26dB(A) for the rear of the site to ensure the internal noise levels meet the requirements of the WHO document, which is an internal LAeq 16hour (0700-2300) of 35dB and an LAeq 8hour (2300-0700) of 30dB and an instantaneous LAFmax internal value of 45dB.

5.3 The WHO document along with BS8233 states that the instantaneous internal LAFmax 8hour (2300-0700) should not exceed 45dB(A). Due to the noise source at the front of the site being road traffic an LAmax 1hour value has been used as the noise is not instantaneous, however at the rear of the site the noise is intermittent so the LAmax has been measured in 5minute intervals in this location to ensure worst case scenario.

5.4 The worst case scenario has been assumed in order to ensure that the future residents will be protected from the external noise emissions apparent at the site.

5.5 The results taken above were taken over a typical working day so it is assumed that the results offer a fair representation of the daily noise emissions apparent at the proposed site. The road traffic was very busy during the measurement set up period and the insustrial unit was in operation.

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6 Results Conclusion:

6.1 The LAmax values are measured during the night time period only to determine if the instantaneous noise will pose a nuisance for sleep disturbance; this does not apply to the daytime noise levels due to sleep disturbance not being typically apparent during this time period.

6.2 The tables listed above clearly indicate the necessary reductions that must be met to ensure that the internal noise requirements are met; the noise levels measured have been compared to the requirements of the WHO document. This document clearly lists the required reductions of the building specifications for the microphone locations.

6.3 The reductions can be met by ensuring that the correct windows are installed to the building. In addition it may be necessary to install acoustic trickle ventilation to ensure the dwellings can be ventilated without diminishing the integrity of the façade, however based on the noise levels this may be excessive.

6.4 The area is obviously busy for long periods of the day which is expected for a busy road; however the industrial unit is closed during the noise sensitive period so this shouldn't pose a nuisance during the noise sensitive hours.

7 Results Summary:

7.1 The results indicate that the external noise emissions should not pose a nuisance for future residents of the proposed dwelling providing adequate materials are implemented to the building elements. The sound reductions listed in this report all meet the requirements of the WHO document and if implemented then there is no reason why future residents can't have a reasonable standard of living at the proposed address.

7.2 Noise should not prove to be a nuisance for the future residents of the site if adequate mitigation measures and building elements are installed.

8 Code of Practice: BS8233: 2014- Sound Insulation and noise reduction for buildings.

Activity	Location	0700-2300	2300-0700
Resting	Living Rooms	35dB LAeq,16hour	-
Dining	Dining Room/Area	40dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB LAeq,8hour

8.1 The table listed above shows the internal criteria set out in BS8233-2014, this criteria is very similar to that listed with the WHO document. Providing that adequate building materials and specifications are implemented, the internal criteria listed above should be met.

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At present the exact specifications have not been determined but they are believed to be something similar to those listed below.

9 ***Façade Detail –*** The facade detail is believed to be something similar to - Aggregate block cavity wall, minimum 100mm blocks (minimum density 1350kg/m3), minimum 75mm cavity between leaves, finished with 13mm plaster. This system should achieve a sound reduction of between 50-52dB DnT,w + Ctr '*Code of Practice BS8233: 2014, Page 60 – Table E.1B – Airborne sound insulation of walls and partitions'*. Also a cavity wall system comprising of 7N concrete blocks (two separate frames), have a sound reduction of approximately 53dB (*predicted weighted sound reduction index values of Celcon Blockwork – from H&H Celcon).*

10 ***Roof Detail –*** The proposed roof detail is something similar to: Tiles on felt, pitched roof with 100mm mineral wool on plasterboard ceiling - sound reduction of 43dB (*Code of practice BS 8233: 2014, page 41).*

11 ***Windows –*** Standard double glazing offers a sound reduction of 30-35dB so providing a similar system is used then these should ensure adequate protection for the residents.

11.1 A suitable glazing option is listed below, but the final specification has not yet been determined so the actual specification may change slightly, but it must have a minimum sound reduction of 30dB.

Glazing Detail	Sound Reduction
4/12/4 double glazing	31dB
4/12/12 sealed Units	36dB

12 **Acoustic Ventilation –** Based on the measured noise levels it would appear excessive to install acoustic trickle vents, but if they are required then the specification can be determined, they also must have a sound reduction of 30dB.

Vent System	Description	Noise Reduction
Simon Acoustic EHA	Window Trickle Vent	38dB Closed - 36dB Open
Simon Acoustic SL	Window Trickle Vent	39dB Closed - 33dB Open

13 **Conclusion:**

13.1 The noise levels have been measured to anticipate the existing emissions produced at the site. With adequate materials/specifications being used there is no reason why the future residents can't enjoy a reasonable standard of living in the proposed development.

13.2 This report clearly shows the reductions needed to protect the future residents from the noise emissions produced from the noise sources located to the Northeast & Southeast, these measures should be adopted to the entire site. If these methods are followed then there is no reason why noise would be a nuisance in the future.

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APPENDIX

Continuous equivalent noise level, LAeq — the steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

LAmax - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) — A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room – A room used for sleeping or recreation/relaxation

Dne,w Weighted element normalised level difference – A single-number quantity which characterises the airborne sound insulation of a small building elements.

EPU – Environmental Protection Unit

Rw Weighted sound reduction index – A single-number quantity which characterises the airborne sound insulation of a material or building element measured in the laboratory.

LA10 – The A-weighted noise level exceeded for 10% of the measurement duration.

LA90 - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

World Health Organization (WHO) - Guidelines for Community Noise.

Code of Practice: BS8233: 2014- Sound Insulation and noise reduction for buildings.

Activity	Location	0700-2300	2300-0700
Resting	Living Rooms	35dB LAeq,16hour	-
Dining	Dining Room/Area	40dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB LAeq,8hour

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14 Google Earth:

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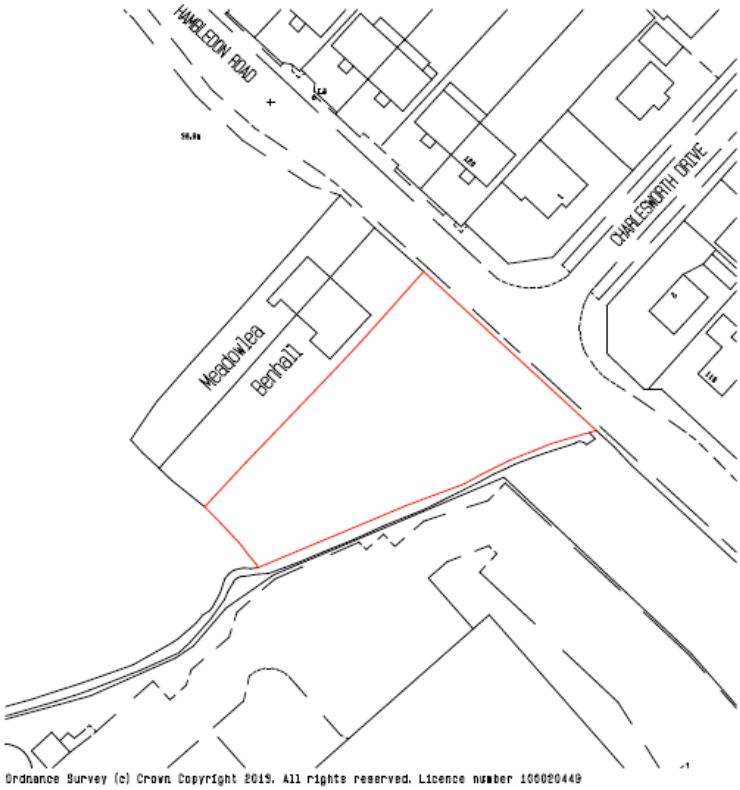
15 **Site Plans:**



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15.1 Site Plans:

A site plan showing proposed building.

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15.2 Site Plans:

A site plan showing the proposed internal layout of the site and also the elevations of the building.

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