



AIRTIGHT & NOISECHECK LIMITED

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ACOUSTIC TESTING REPORT FOR

**REL WINCHESTER LTD
3 MARMION ROAD
SOUTHSEA
PORTSMOUTH
PO5 2AT**

SITE ADDRESS

**PROPOSED RESIDENTIAL DEVELOPMENT
WESSEX PLANT SITE
8 NEW LANE
HAVANT
HAMPSHIRE
PO9 2NL**

Acoustic Engineer:

Date: 16-17th September 2015

Mark Witcher

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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All Raw Data can be sent upon request.

Test Engineer:



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Date: 16-17th September 2015

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Customer Name:

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REL Winchester Ltd
3 Marmion Road
Southsea
Portsmouth
Hampshire
PO5 2AT

Site Address:

Proposed Residential Development
Wessex Plant Site
8 New Lane
Havant
Hampshire
PO9 2NL

Acoustic Engineer:

Mr. Mark Witcher

Equipment used:

Norsonic Environmental Analyser 121 – NOR121 serial No 31399, Calibration due April 2017

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 1.43 -1997 type 1
ANSI S1.11-1986 order 3 type 1D
DIN 45 657
Norsonic Production Standard set of the Nor121

Measurement Microphone (Nor 1225) – Serial No 72933, Calibration due April 2017

Acoustic Calibrator (Nor 1251) - serial no 31652 - Calibration due June 2016

Measurement Procedure:

The external background noise levels were recorded for a 24hour period in one microphone location to determine the associated noise levels at the site. In particular the noise associated with the railway line located to the South of the proposed dwellings

The findings of the report will be compared to various British Standards, in particular BS8233: 2014 'Guidance on sound insulation and Noise Reduction for Buildings' and reference made to WHO Guidelines for community noise.



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Executive Summary:

Airtight & Noisecheck were commissioned by PLC Architects Ltd on behalf of REL Winchester Ltd to undertake a Noise Impact Assessment to determine the current noise emissions associated with the former Wessex Plant Site, 8 New Lane, Havant. These noise levels were measured for a period of 24 hours in order to establish a fair reflection of the anticipated noise levels apparent in microphone location, and as a result provide adequate mitigation measures to ensure the future residents are protected from external noise emissions apparent on site.

The site in question is a former plant site that lies directly to the East of New Lane & South of Eastern Road. There are existing buildings located on site and part of the site is used as a 24-hour call out vehicle recovery service. An outline planning application has been made for the erection of 39 no residential dwelling – flats situated in 3 blocks and built over 3 floors. These blocks will comprise of Blocks A, B & C with C being the closest to the railway line. The unit numbers are listed in the table below

	Block A	Block B	Block C
Ground Floor	20,21,22,23,24,25	9,10,11,12	1,2,3
1st Floor	26,27,28,29,30,31,32	13,14,15,16	4,5,6
2nd Floor	33,34,35,36,37,38,39	17,18,19	7,8

Based on the measured noise levels and calculated levels there is no reason to suggest that the future residents will be adversely affected by the noise levels. The noise levels have been measured at the approximate facade of block C that will be facing the railway line which is the only noise source apparent in the immediate vicinity and providing the necessary mitigation measures are implemented to this facade (other facades will be protected & screened) then there is no reason to suggest that the residents will be adversely affected by the noise emissions produced by vehicular traffic using Southgate Street.

The necessary reductions for the different building elements are listed in this report.

There are also many existing residential dwellings, including new build developments and a hotel in the immediate area suggesting that the acoustic environment should not have an adverse impact on the future residents of this scheme.

The level of sound reductions will vary depending on the façade, orientation & screening of other buildings in relation to the noise source. The Grade 2 listed building currently used by Network Rail will remain so this will also have some level of screening for some dwellings.



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1 Objective:

1.1 To determine the existing external noise levels associated with the site address. The site currently comprises of numerous buildings and a 24hour vehicle recovery service also operate within the site. A planning application has been made to demolish the existing buildings and erect 3 x purpose built blocks of residential dwellings. The purpose of this report is to ensure that the future residents of the proposed development will be protected from the external noise emissions associated with the local area.

The external noise emissions were recorded at the approximate nearest residential facade of the development on the Southern facade, facing the railway line. The apparent noise sources were the railway line located to the South of the proposed site. It is understood that this is the only noise source apparent for this residential scheme.

2 Assessment Criteria:

2.1 The NPPF came into effect in March 2012 and replaced other documents such as PPG24. The NPPF provides a number of objectives and aims that are directed towards avoiding significant adverse impacts and reducing others on quality of life and health. This document states that:

The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

2.2 The NPSE states the following aims with respect to noise policy:

2.3 Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of the Government policy on sustainable development:

*avoid significant adverse impacts on health and quality of life;
mitigate and minimise adverse impacts on health and quality of life; and
where possible, contribute to the improvement of health and quality of life.*

2.4 BS8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' defines a range of ambient noise levels for design purposes, in order that appropriate conditions are achieved in certain internal environments. These internal requirements are listed in the table below.

BS8233: Table 5 – Indoor Ambient noise levels in spaces when they are unoccupied.

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

2.5 Night time noise events can have a significant impact on sleep disturbance. There is no specific guidance presented in BS8233 regarding a noise limit to maximum night time noise ($L_{Amax,F}$). As part of this assessment the number of night time noise events will be considered in a qualitative manner with an internal $L_{Amax,F}$ of 45dB used as an initial screening tool to identify night-time noise events that may be of significance to sleeping conditions in bedrooms.



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3 Calibration:

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

4 Site Layout:

4.1 New Lane is located on the outskirts of Havant Town Centre to the North. The site is a large parcel of land that was formerly used as a plant site. The proposed site is located on the Corner of New Lane (to the West) and Eastern Road (to the North) with a cemetery located further North along with a large industrial estate and dwellings. There is a builder's yard located to the East of the site and dwellings located to the West.

4.2 The proposed layout of dwellings is shown later in the report, it is clear that there are to be residential bedrooms facing the railway line and the necessary Mitigation measures will need to be implemented throughout the site.

4.3 The noise sources apparent on is the railway line located to the South of the proposed site. The proposed building will be located at varying distances from the railway line so the level of sound attenuation required will vary due to a number of factors.

4.4 The area is a mixture of industrial units and residential dwellings, there is also a 24hour vehicle recovery business in operation on the site so the night time noise events may have been made by this service.

4.5 The microphone was located:

1- Approximate Southern Facade of block C, at least 3m from ground level and in excess of 3.5metres from any other reflective surface.

5 Weather Conditions:

5.1 The weather was dry and fairly warm during the measurement procedures, the temperatures ranged between 3-11degrees. There was no wind during the measurement period, but there was a heavy downpour during the afternoon of the measurement period.

6 Results:

6.1 The measured noise levels for the microphone location is listed in the table below.
Mic Location One:

Mic Location	LAeq 16hour - Day	LAeq 8hour - Night	LAmaz 1hour - Night
Southern Facade	65dB(A)	60dB(A)	89dB(A)
Reduction Needed	30dB(A)	30dB(A)	44dB(A)

6.2 The average noise levels measured above are predominantly derived from the general noise emissions associated with the site and the night time events are believed to be trains passing the site. The 'reduction needed' relates to the reduction required to meet the requirements of BS8233: 2104 for the L_{Aeq} values and WHO guidelines for the L_{Amax} values. Due to the noise emissions being associated with rail traffic the $L_{Amax 15min}$ value has been used. The night time events seem to be pretty regular so it is assumed this is caused by trains and not the vehicle recovery service.



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AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**7 Results Conclusion:**

7.1 For the purpose of this report the guidelines within BS8233:2014 have been used, this document gives internal criteria for noise sensitive rooms. The criteria of this document is listed in the table below.

BS8233: Table 5 – Indoor Ambient noise levels in spaces when they are unoccupied.

Activity	Location	0700-2300	2300-0700
Resting	Living Rooms	35dB LAeq16hour	-
Dining	Dining Room/Area	40dB LAeq16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq16hour	30dB LAeq8hour

7.2 Whilst not listed in BS8233: 2014 there is a requirement to ensure that the L_{AFmax} values do not exceed 45dB inside a bedroom. As the noise source is road traffic and not instantaneous noise - the 15min L_{AFmax} values have been used for this assessment during the night time period.

8 Results Summary:

8.1 The level of sound attenuation required will vary throughout the site, due to distance from noise source, orientation of façade and screening offered by other buildings. A sound propagation equation has been used to determine the noise levels at the façade for the other blocks, this is listed below and the railway line is deemed a line source.

$$8.2 \quad L_2 = L_1 - 10 \log (r_2/r_1)$$

$$L_2 = 89 - 10 \log (30(\text{block B}) \text{ or } 45 (\text{Block A})/10)$$

Where:

89 L_{Amax} value at source

30 – distance to Block B façade

55 – distance to Block A façade

10 – distance from mic to noise source

8.3 Based on the above equation, the levels of sound reduction for Blocks A&B facades that face the railway line are listed in the table below. Due to screening and orientation it is anticipated that the Northern facades of all Blocks & Southern façade of Blocks A&B should have standard double glazing windows installed.

	Block A	Block B
Calculated L_{Amax} Value	85dB	82dB
Reduction Needed	40dBA	37dBA

8.4 It may be necessary to install a MVHR system throughout the blocks to ensure that the blocks can be ventilated without diminishing the integrity of the façade and windows.

8.5 There will be some facades that do not directly face the noise source, and others that will be screened so the level of sound reduction required will not be as great in these locations.



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Standard mitigation measures will be implemented to the building fabric and elements in order to achieve standard reductions at each facade of the proposed development, the mitigation measures listed below should offer the necessary reductions to satisfy the necessary regulations. The varying level of sound attenuation necessary at each affected facade is listed in this report.

9 Façade Detail – The proposed façade detail traditional brick, with the specification believed to comprise of something similar to a high dense concrete cavity wall. A cavity wall system comprising of - Dense aggregate concrete block cavity wall with 50mm cavity and wall ties of the butterfly wire type. Plaster finish on both sides. Joints in block work well filled. Overall mass per unit area not less than 415 Kg/m² should offer a sound reduction of between 54-60dBA ‘Code of Practice BS8233: 1999, Page 46 – Table E.2 – 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 believed to be similar to: Tiles and felt on a timber joists, 100mm mineral wool insulation is placed within the void and 2 x 12.5mm plasterboard on underside of joists. This system will offer a sound reduction of 43dB (*Code of practice BS 8233: 1999, page 28*). This system should satisfy the requirements. This level should be adequate due to the orientation of the roof in relation to the noise source.

11 Windows - The proposed windows to be used is unknown but standard double glazed systems offer a sound reduction of between 30-35dB so this should be adequate for the facades not facing Southgate Street. The windows to be installed to the bedrooms facing the railway line need to have a minimum sound reduction of 44dB for block C, 40dB for Block B and 37dB for block A. The specifications below offers these levels of reduction but the exact proposed specification is unknown and it is recommended that the window manufacturer provide the necessary documentation upon installation to ensure the correct materials have been used.

Possible Units	Thickness	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Overall reduction
SG Solaglass 4-12-6.8	22.8mm	25	25	32	38	49	45	38dB
SG Solaglass 5-20-11.8	36.8mm	23	31	36	47	45	51	41dB
SG Solaglass 8-16-16.8	40.8mm	28	36	39	45	46	58	44dB

There are many other suitable products and the client will have to show compliance for the windows before installation, the manufacturer will have the acoustic data for the windows.

12 Ventilation - A ventilation system may be required for the bedrooms facing Southgate Street, one option is to install a NVHR system to the building and another solution would be to install acoustic trickle vents to the windows of these rooms. The trickle vent listed below achieves the necessary reduction.

Product	Sound Reduction - Open	Sound Reduction - Closed
Simon Acoustic EHAS	38dB	41dB
Greenwood EAR42W	42dBA	
Greenwood 2500EA/5000EA	45dBA	
Greenwood AAB	46dBA	
MVHR system to all blocks		

12.1 There are other products available and this one was listed as an example.



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13 Conclusion:

13.1 The noise levels have been measured at the assumed worst case scenario location for the site, and the noise levels that have been measured indicate the noise sources apparent to be the trains using the railway line located to the South.

13.2 The noise levels measured indicate that providing the necessary mitigation measures are implemented, with the sound reduction values as listed in the results tables in this report the future residents should not be affected by adverse external noise levels.

13.3 The necessary reductions that are required for the measurement locations are listed within this report, these are the minimum sound reduction levels that will be required for the windows facing the relevant noise source, these are the necessary reductions that must be adopted by the developer to ensure the residents are not affected by the external noise levels.

13.4 The developer could take steps to ensure that the residents are protected further, these steps include:

- Minimise the number of habitable rooms facing the major noise source
- Design the development in such a way that bedrooms are positioned on quieter facades
- Configure certain blocks in such a way that they offer protection to other blocks and dwellings.

Based on the site plan attached it is evident that a lot of the site will be adequately screened and protected from the road traffic using Southgate Street, and even the noise levels for the dwellings facing the noise sources should be adequately protected providing the necessary mitigation measures are implemented.

13.5 There are existing residential dwellings located in close proximity to the railway line, indicating that other residents are exposed to similar levels of external noise emissions and these noise levels do not have an adverse impact on the residential dwellings.



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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.

L_{Amax} - 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

D_{ne,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

R_w 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:

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

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



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Google Earth:



Handwritten signature of Mark Witcher

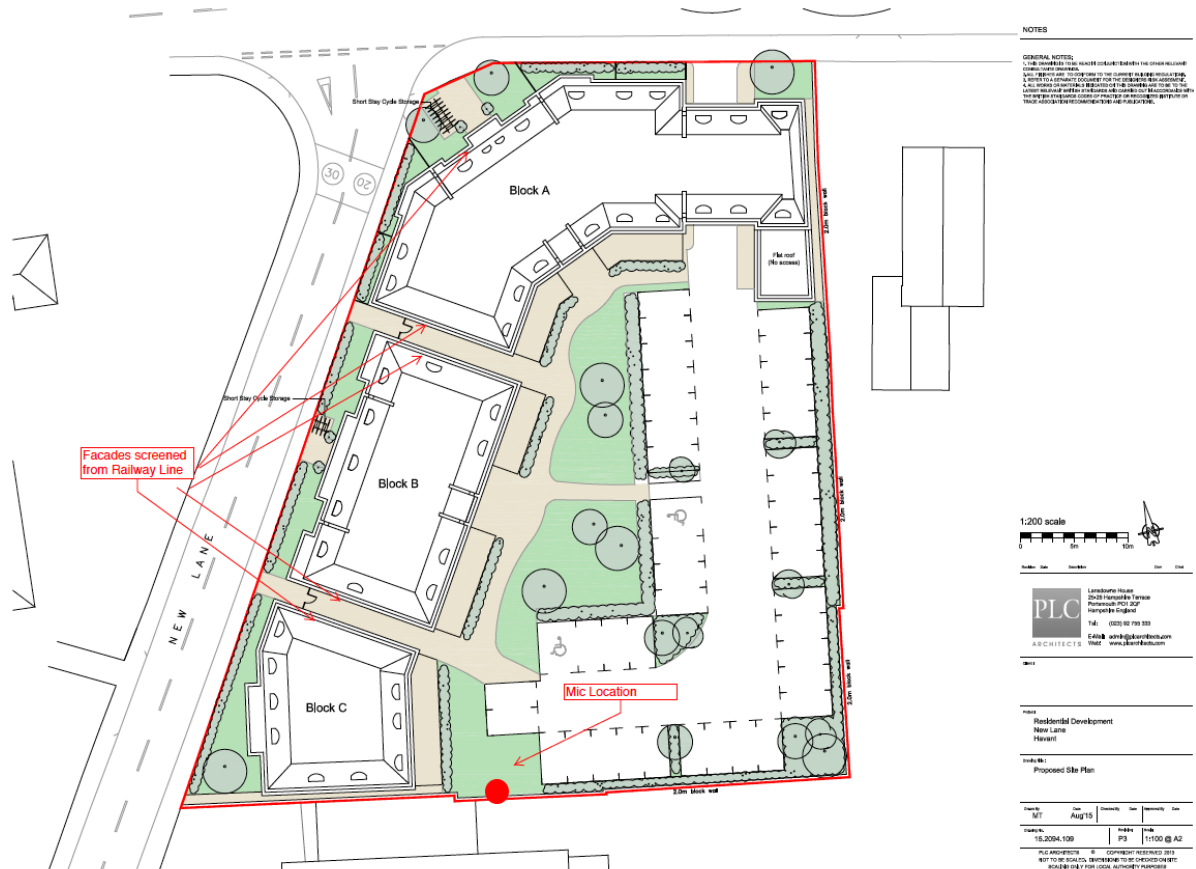
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Site Plan



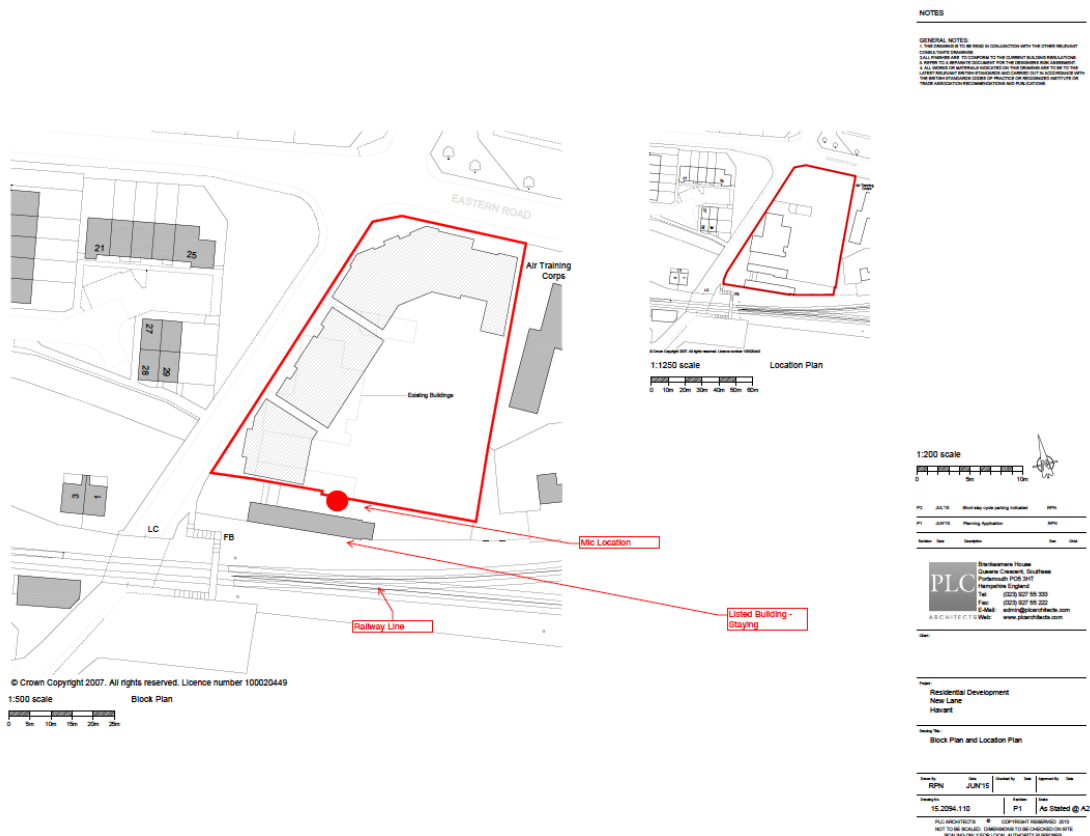
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