CHALCOT SCHOOL - CAMDEN CENTRE FOR LEARNING

HARMOOD STREET, CAMDEN, LONDON

BREEAM POL 05 - NOISE IMPACT ASSESSMENT

Report No. MRL/100/954.1v1
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BREEAM POL 05 - NOISE IMPACT ASSESSMENT

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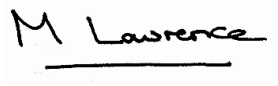

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1.0 INTRODUCTION

1.1 MRL Acoustics was commissioned by Architype to carry out a noise impact assessment for the purposes of BREEAM POL 05 in relation to proposed items of building services plant at the Chalcot School - Camden Centre For Learning, Harmood Street, Camden, London.

1.2 The proposed building services plant consists of 2 no. MVHR air heat recovery units; 2 no. cooling condenser units and 2 no. small general extract flues.

1.3 For the BREEAM assessment, POL 05 states:-

"Where there are or will be noise-sensitive areas or buildings within 800m radius of the assessed development a noise impact assessment in compliance with BS 7445-1 should be carried out and the following noise levels measured/determined:-

- Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar;

- The rating noise level resulting from the new noise-source.

1.4 Our assessment has involved the following scope of work:-

i) Carrying out noise measurements of the background noise climate in the early hours of the morning at the nearest residential properties;

ii) Carrying out calculations of the resultant noise from the items of building services plant at the nearest noise-sensitive properties;

iii) Assessing the noise impact in accordance with BS 4142 : 2014;

iv) Providing recommendations for any additional noise mitigation measures, if necessary.

1.5 This report details our findings and our recommendations.

1.6 Noise levels referred to in the text have been rounded to the nearest whole decibel (dB), as fractions of decibels are imperceptible.

1.7 An explanation of acoustical terms used in this report is provided in Appendix I.

2.0 NOISE LEVEL SURVEY

2.1 A noise level survey was carried out at the nearest residential properties to the site from 11pm on Thursday 17th August until 3am on Friday 18th August 2015 in order to assess the existing ambient noise climate at these properties during the time when the background noise climate will be at its lowest during any typical 24-hour period.

2.2 Noise measurements were undertaken adjacent to the school outside the nearest residential property to the north of the site, as shown in the location plan below:-

Noise Measurement Location ★

2.3 The measurements consisted of consecutive 5-minute samples of noise over a continuous 3-hour period.

2.4 The noise survey was carried out using a Rion NA-28 Type 1 Sound Level Meter (serial no. 01291241) fitted within an environmental weather-proof case. The calibration level of the

meter was checked before and after the survey with a Rion NC-74 sound calibrator (serial no. 35094450) with no variation in the levels observed.

2.5 The microphone was fitted on a tripod at a height of 1.5m above ground level and was fitted with a Rion WS-15 weather-proof windshield. The calibration level of the meter was checked before and after the survey with a Rion NC-74 sound calibrator with no variation in the levels observed.

2.6 The weather conditions for the survey were generally mild and dry with a light breeze throughout. The temperature was measured as 14° Celsius and the wind speed was less than 1m/second which represented acceptable conditions for noise measurements.

2.7 The noise survey was carried out in accordance with the requirements outlined in BS 7455 – 1 : 2003 for environmental noise surveys.

2.8 It was noted during the noise survey that the dominant noise source in the area was from intermittent local road traffic noise and general distant traffic noise.

2.9 The results of the noise survey are summarised in Table 1 below and are detailed in Appendix II at the end of this report.

Table 1: Results of Noise Level Survey

Location	Time	Noise Levels (dB)			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
At Nearest Residential Property	11pm – 3am	45	58	44	39

3.0 NOISE IMPACT ASSESSMENT

3.1 We have been provided with the following noise emission data levels for the proposed items of external building services plant:-

- HRV 01: 75 dB Sound Power Level (SWL);
- HRV 02: 67 dB Sound Power Level (SWL);
- 2 x MUZ-HJ35VA Condenser Units: 64 dB Sound Power Level each;
- 2 no. General Extract Flues: No Noise Data Available.

3.2 It is considered that the 2 no. general extract flues are not sufficient in size to warrant inclusion in the overall noise impact assessment as the noise from the other items of plant will have the most significant noise impact.

3.3 Based on the manufacturer's noise data outlined above, we have calculated the following resultant noise levels at the nearest residential property directly adjacent to the north of the site, as being:-

- HRV 01: 31 dB L_{Aeq};
- HRV 02: 24 dB $L_{Aeq;}$
- 2 x MUZ-HJ35VA Condenser Units: 29 dB $L_{Aeq;}$
- 2 no. General Extract Flues: N/A.

3.4 The total resultant noise impact of all the above items of plant operating simultaneously has been calculated as being 34 dB L_{Aeq} when assessed at the residential site boundary of the nearest residential property to the north of the site.

3.5 The noise calculations for each item of plant are detailed in Appendix III and the locations of each individual item of plant are indicated on the site layout plan at the end of this report.

BS 4142 Assessment

3.6 When assessing potential noise impact, most Local Authorities refer to British Standard 4142 'Methods for rating and assessing industrial and commercial sound', 2014.

3.7 BS 4142 requires the noise from the equipment (in L_{Aeq}) to be compared with the background noise level (L_{A90}) in the absence of the machine noise. If the specific noise contains either a tonal or compulsive element then a rating penalty may be applied to the calculated level to allow for these characteristics to obtain the 'Rating Level'.

3.8 British Standard 4142 states that an initial estimate of the impact of the specific sound should be obtained by subtracting the measured background sound level from the rating level and then consider the following:-

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.9 BS 4142 also allows for an 'on-time' correction for the noise sources being assessed in that if the noise source does not operate continuously over the assessment period (1-hour periods for daytime assessments; 15-minute periods for night-time assessments), then the specific noise level is reduced accordingly.

3.10 We have based the assessment on the assumption that all of the items of plant will operate simultaneously and continuously over any given 1-hour period during the daytime and any given 15-minute period at night. Therefore no 'on-time' correction has been applied.

3.11 Table 2 below shows the assessment to BS 4142. A rating penalty correction has been added to the Rating Noise level in accordance with the subjective assessment methodology set out BS 4142 to allow for any tonal or impulsive noise component.

3.12 We have also allowed for a 10 dB attenuation in the calculated noise levels to allow for the existing screening between the rooftop sited plant and the residential properties, i.e. the effective screening provided by the actual school building itself.

Table 2: Assessment to British Standard 4142 : 2014

Description	3 No. Items of Plant	
	Daytime (07:00 – 23:00)	**Nigh-time (23:00 – 07:00)**
Specific Noise Level (L_{Aeq})	34 dB	34 dB
Acoustic Penalty (Intermittent Noise)	+ 5 dB	+ 5 dB
Duration (seconds)	3600	900
'On-time' Correction	0 dB	0 dB
Screening	- 10 dB	- 10 dB
Rating Level	29 dB	29 dB
Background Noise Level	45 dB*	40 dB
Excess of Rating Level Over Background Noise Level	**- 16 dB**	**- 11 dB**

* Estimated Daytime Background Noise Level

3.13 The results in Table 2 above show that the Noise Rating Levels of the main items of building services plant are substantially lower than both the daytime and night-time background noise climate at the nearest noise-sensitive properties to the site, with a difference of approximately 16 dB lower during the daytime and 11 dB lower during the night-time.

3.14 British Standard 4142 states that where the Noise Rating Level does not exceed the background sound level, this is an indication of the specific sound source having a low

impact, and in this instance, the impact is considered low enough to conclude that that there will be no adverse effect on any residential amenity.

3.15 Therefore the noise impact is considered to be within acceptable limits, based on the assumption that the 2 no. general extract flues do not emit noise levels of more than 20 dB(A) when assessed at the site boundary with the nearest residential property.

3.16 As these are just small general extract fans, then the recommended noise limit outlined above should be easily achieved.

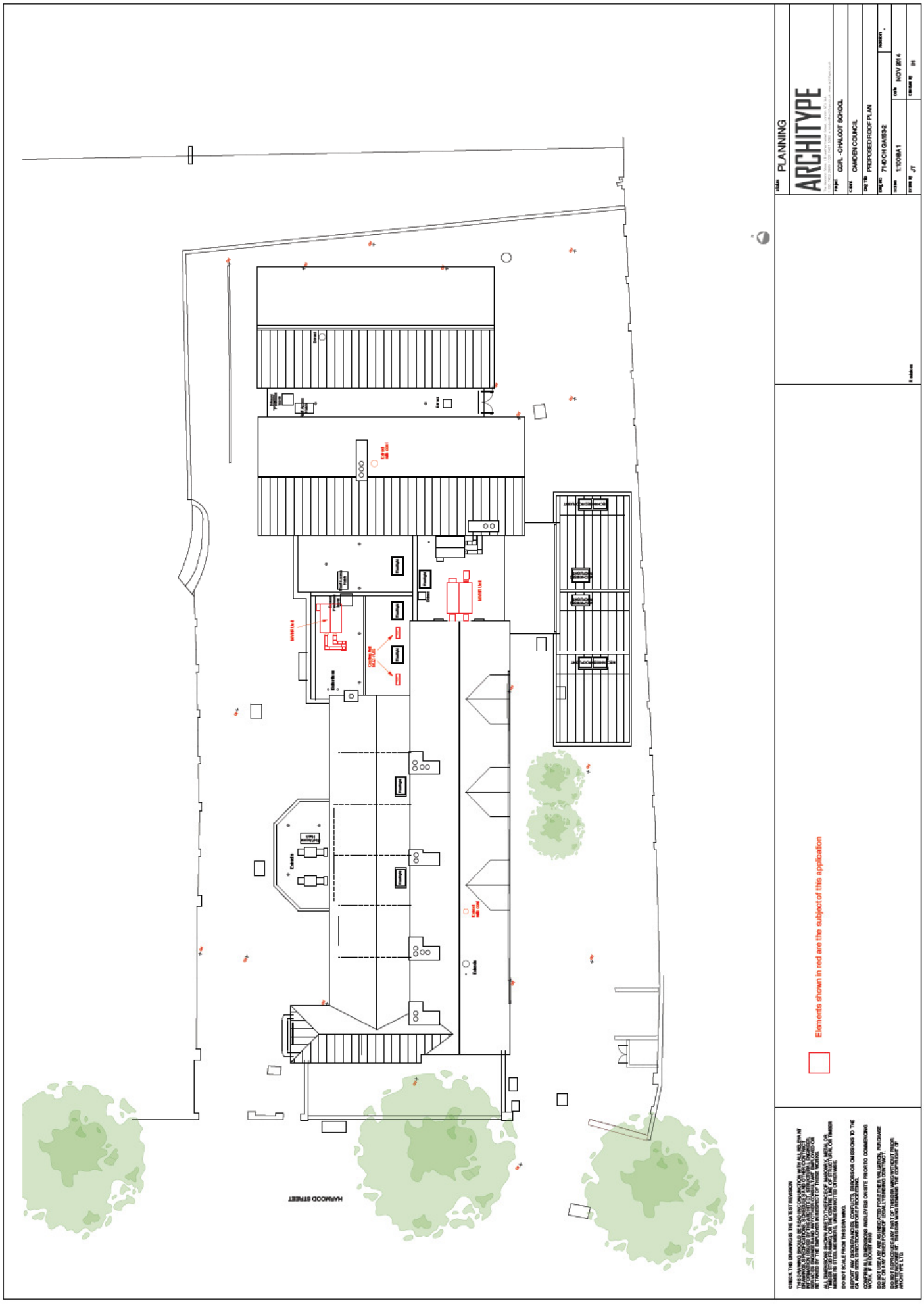
4.0 SUMMARY AND CONCLUSIONS

4.1 MRL Acoustics has carried out a noise impact assessment on behalf of Architype for the purposes of BREEAM POL 05 in relation to proposed items of building services plant at the Chalcot School - Camden Centre For Learning, Harmood Street, Camden, London.

4.2 This has involved carrying out background noise measurements at the nearest affected residential properties to the site in the early hours of the morning; calculations of the noise emissions from the various items of equipment based on the manufacturer's sound data; and undertaking an assessment of the noise impact in accordance with BS 4142 : 2014.

4.3 The results demonstrate that the Noise Rating Levels of the plant provide a positive indication of the specific sound sources having a very low impact.

4.4 In conclusion, it is considered that no specific scheme of additional noise mitigation measures are required to ensure that the noise impact from the proposed items of building services plant will be within acceptable limits and should not result in a significant noise impact at any nearby dwellings.


PLANNING
ARCHITYPE
CCfL - CHALCOT SCHOOL
CAMDEN COUNCIL
PROPOSED ROOF PLAN
7140 CH GA 1832
1:100@A1
NOV 2014
Elements shown in red are the subject of this application
HARWOOD STREET

APPENDIX I – NOISE UNITS AND INDICES

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

c) A-weighting

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters and is denoted dB(A) or dBLA.

d) Glossary of Terms

When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The indices used in this report are described below:-

L_{Aeq} The A-weighted 'equivalent continuous noise level' is an average of the total sound energy measured over a specified time period, i.e. L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period.

L_{Amax} The maximum A-weighted noise level recorded during the monitoring period.

L_{A10} The A-weighted noise level exceeded for 10% of the specified time period. L_{A10} is most often used as a measure of traffic noise.

L_{A90} The A-weighted noise level exceeded for 90% of the specified time period. L_{A90} is used as a measure of 'background noise'.

SEL The 'sound exposure level' of a single event (such as a passing train) and is the L_{Aeq} value of the whole event normalised to a 1 second period level of a sound.

APPENDIX II – RESULTS OF NOISE LEVEL SURVEY

Date: Thursday 13th August - Friday 14th August 2015

Equipment: Rion NA-28 'Type 1' sound level meter (s/n 01291241), environmental weather case, outdoor microphone, calibrator, tripod

Weather: Generally mild and dry with a light breeze throughout

Results: All values in dB(A)

Table A1: Ambient Noise Level Survey Results

Date	Time	Leq	Lmax	L10	L90	SPL Time Weighting
13/08/2015	23:00	43.70	53.90	45.90	42.00	Fast
13/08/2015	23:05	56.50	70.40	62.40	42.60	Fast
13/08/2015	23:10	45.90	59.70	47.90	42.40	Fast
13/08/2015	23:15	45.40	63.40	47.00	41.30	Fast
13/08/2015	23:20	43.70	58.10	45.30	40.80	Fast
13/08/2015	23:25	48.60	63.80	53.90	41.30	Fast
13/08/2015	23:30	42.40	61.10	44.20	39.60	Fast
13/08/2015	23:35	41.40	51.00	43.60	39.80	Fast
13/08/2015	23:40	41.10	49.10	43.10	38.80	Fast
13/08/2015	23:45	40.90	46.30	42.90	39.50	Fast
13/08/2015	23:50	42.80	61.60	43.80	39.20	Fast
13/08/2015	23:55	45.50	64.20	46.00	39.20	Fast
14/08/2015	00:00	41.10	59.50	41.80	37.80	Fast
14/08/2015	00:05	40.10	49.90	42.00	38.60	Fast
14/08/2015	00:10	45.20	58.40	48.60	40.00	Fast
14/08/2015	00:15	39.60	46.90	41.50	38.40	Fast
14/08/2015	00:20	39.80	44.70	41.50	38.90	Fast
14/08/2015	00:25	39.70	45.80	41.80	38.00	Fast
14/08/2015	00:30	39.00	46.30	41.30	37.50	Fast
14/08/2015	00:35	47.30	64.70	49.00	38.00	Fast
14/08/2015	00:40	39.90	45.70	41.90	38.70	Fast
14/08/2015	00:45	46.90	64.50	44.10	38.40	Fast
14/08/2015	00:50	47.10	76.20	45.50	39.60	Fast
14/08/2015	00:55	42.80	59.40	44.60	39.00	Fast
14/08/2015	01:00	41.10	56.10	43.10	38.90	Fast
14/08/2015	01:05	41.80	59.20	43.50	39.20	Fast
14/08/2015	01:10	42.50	60.10	43.50	38.50	Fast
14/08/2015	01:15	41.80	56.00	43.60	39.30	Fast
14/08/2015	01:20	48.00	67.70	51.10	38.70	Fast
14/08/2015	01:25	45.40	64.60	45.40	38.80	Fast
14/08/2015	01:30	49.40	65.50	53.40	41.50	Fast
14/08/2015	01:35	44.20	60.40	46.00	38.30	Fast
14/08/2015	01:40	40.70	49.10	42.60	39.10	Fast
14/08/2015	01:45	40.50	51.20	42.50	38.30	Fast
14/08/2015	01:50	41.90	53.30	44.90	38.80	Fast
14/08/2015	01:55	40.70	62.50	42.00	37.50	Fast

14/08/2015	02:00	41.60	61.10	43.70	37.70	Fast
14/08/2015	02:05	40.80	63.90	41.20	37.60	Fast
14/08/2015	02:10	41.40	58.60	42.50	39.10	Fast
14/08/2015	02:15	38.60	46.30	40.80	37.20	Fast
14/08/2015	02:20	41.10	55.70	44.40	37.10	Fast
14/08/2015	02:25	44.90	72.80	42.10	37.00	Fast
14/08/2015	02:30	44.60	69.80	44.70	36.80	Fast
14/08/2015	02:35	37.20	44.40	39.70	36.30	Fast
14/08/2015	02:40	39.10	48.10	41.50	36.90	Fast
14/08/2015	02:45	36.80	44.10	39.10	36.10	Fast
14/08/2015	02:50	40.80	63.50	40.90	35.50	Fast
14/08/2015	02:55	38.90	65.00	40.30	35.30	Fast
14/08/2015	03:00	39.40	57.80	41.80	36.00	Fast

APPENDIX III – PLANT NOISE CALCULATIONS

Fan Noise Spreadsheet - Sound Power Level and Distance Calculations										
Fan Details :	**HRV 01**									
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**		
Fan SWL	68.0	67.0	66.0	68.0	63.0	68.0	61.0	54.0	**75.0**	**dB**
Silencer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
New SWL	68.0	67.0	66.0	68.0	63.0	68.0	61.0	54.0		
Distance	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0		
Distance Attenuation	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5		
Hemispherical	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
Directivity	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
Receiver SPL	26.5	25.5	24.5	26.5	21.5	26.5	19.5	12.5	**33.5**	**dB**
A-Weighting	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1		
dB(A) Level	0.3	9.4	15.9	23.3	21.5	27.7	20.5	11.4	**30.5**	**dB(A)**
Existing LA90	49.1	37.7	34.4	34.7	37.2	30.0	29.1	25.7	**50.0**	**dB**
A-Weighting	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1		
dB(A) Level	22.9	21.6	25.8	31.5	37.2	31.2	30.1	24.6	**40.0**	**dB(A)**
Difference	-22.6	-12.2	-9.9	-8.2	-15.7	-3.5	-9.6	-13.2	**Negative is OK**	
Fan Details :	**HRV 02**									
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**		
Fan SWL	62.0	61.0	58.0	59.0	53.0	58.0	50.0	44.0	**67.2**	**dB**
Silencer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
New SWL	62.0	61.0	58.0	59.0	53.0	58.0	50.0	44.0		
Distance	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
Distance Attenuation	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0		
Hemispherical	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
Directivity	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
Receiver SPL	24.0	23.0	20.0	21.0	15.0	20.0	12.0	6.0	**29.2**	**dB**
A-Weighting	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1		
dB(A) Level	-2.2	6.9	11.4	17.8	15.0	21.2	13.0	4.9	**24.2**	**dB(A)**
Existing LA90	49.1	37.7	34.4	34.7	37.2	30.0	29.1	25.7	**50.0**	**dB**
A-Weighting	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1		
dB(A) Level	22.9	21.6	25.8	31.5	37.2	31.2	30.1	24.6	**40.0**	**dB(A)**
Difference	-25.1	-14.7	-14.4	-13.7	-22.2	-10.0	-17.1	-19.7	**Negative is OK**	

2 No. Condenser Units: MUZ-HJ35VA														
Noise Source	**Noise Level 1m Distance**	**No. Units**	**Total Noise Level**	**Residual Level**	**Specific Level**	**On-time Seconds**	**Correction dB**	**Corrected Level**	**Distance Attenuation**	**Breakout Attenuation**	**Screening Atenuation**	**Acoustic Feature**	**Level dB(A)**	
Condenser Unit	56.0	2	59	45.0	59	300	0.0	59	20.0	0.0	10.0	0	**28.8**	
											Total Resultant Level		**28.8**	**dB(A)**