NOISE IMPACT ASSESSMENT FOR PROPOSED MECHANICAL PLANT AT 10 - 11 STEPHEN MEWS, LONDON, W1T 1AG

PREPARED ON THE INSTRUCTIONS OF LOOP INTERIORS LIMITED

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C O N T E N T S

1. INTRODUCTION

1.1 Hawkins & Associates Limited has been engaged by Loop Interiors Limited on behalf of Fremantle Media to provide a noise impact assessment, to support a planning application, for new and relocated mechanical plant that is to be installed on the roof of the building at 10 - 11 Stephen Mews, London, W1T 1AG.

1.2 The nearest Noise Sensitive Receiver (NSR) has been identified, by the planning consultants, Solve Planning, as the residential flats located at 12 Percy Street, to the north-east of 10 - 11 Stephen Mews. The area of installation of the new and relocated mechanical plant is approximately 25 metres from the southern façade of the flats.

1.3 As a result of the travel restrictions at the time of writing this report, environmental noise measurements have not been taken at the NSR. This is, in part, due to the fact that the environmental noise levels are likely to be lower, at present, than they would be typically owing to reduced road traffic. However, a noise survey was undertaken in 2019, by Hawkins & Associates, as part of a noise impact assessment for Fremantle Media at 1 Stephen Street, a building approximately 50 metres south east of the development site. The measurements from the earlier survey were made at 25 Gresse Street, Fizrovia, approximately 80 metres south of 12 Percy Street. The data from this previous survey have been used to inform the likely background noise levels at the NSR and the quietest periods have been considered as part of this assessment.

1.4 The intent of this report is to establish the likely background environmental noise levels at the nearest NSR, and, if necessary, specify mitigation methods to reduce the noise from the mechanical plant to an acceptable level.

1.5 A Glossary of Terms used in this report can be found at **Appendix A**. Weather conditions and equipment details from the 2019 survey can be found at **Appendix B**. A list of references can be found at **Appendix C**. The qualifications of the author of this report can be found at **Appendix D**.

2. DEVELOPMENT SITES AND NEAREST NOISE SENSITIVE RECEIVERS

2.1 The proposed location of the new and relocated mechanical plant is on the roof of the building at 10-11 Stephen Mews. The building is bounded by Stephen Mews to the south, and commercial and mixed use property to the west, north and east. The building is located approximately 75 metres from Tottenham Court Road, which lies to the east.

2.2 The nearest NSR is a residential flat located on the second floor at 12 Percy Street, which is located approximately 20 metres north east of the building at 10-11Stephen Mews. While it has not been confirmed due to travel restrictions preventing a site visit, it is assumed that the second floor flat at 12 Percy Street has windows in the southern façade. Based on a review of recent aerial photographs, the flats do not appear to have any external balconies.

2.3 The proposed location of the new mechanical plant relative to the NSR is shown in **Figure 1**.

Figure 1: Location of new mechanical plant on 10-11 Stephen Mews relative to the location of the NSR ©Google 2020

3. ACOUSTICS CRITERIA

3.1 National Planning Policy Framework

3.1.1 Whilst the National Planning Policy Framework (NPPF) applies generally to new developments, its reference to noise is considered useful in the context of the preservation of amenity and wellbeing for alterations to existing buildings that require planning permission. Current planning policy is based on the NPPF which supports a presumption in favour of development, unless the adverse impacts of that development would outweigh the benefits when assessed against the policies in the Framework, taken as a whole.

3.1.2 The implications of development with respect to noise are recognised at paragraph 123 of the NPPF, where it is stated that planning polices and decisions should aim to:

i. prevent noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

ii. mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from a new development, including through the use of planning conditions;

iii. recognise that development will often create some noise and existing businesses wanting to develop their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.

3.1.3 Paragraph 180 of the NPPF also refers to advice on adverse effects of noise, given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to *"…promote good health and a good quality of life through the effective*

management of noise within the context of Government policy on sustainable development." To achieve this, the Statement sets out the following three aims:

i. Avoid significant adverse impacts on health and quality of life;
ii. Mitigate and minimise adverse impacts on health and quality of life; and
iii. Where possible, contribute to the improvement of health and quality of life.

3.1.4 In achieving these aims, the document introduces significance criteria in the form of 'effect levels' as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. The document states that *"significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development."*

LOAEL – Lowest Observed Adverse Effect Level

This is the level at which adverse effects on health and quality of life can just be detected. The document states that the second aim above (at section 3.1.3ii) lies somewhere between LOAEL and SOAEL and requires that:

"…all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise. This

can be related to the third aim at section 3.1.3iii, above, which seeks *"…where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society."* The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

3.1.5 The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance for how these criteria should be interpreted. Nevertheless, it is clear that there is no requirement to achieve noise levels for which there are no observable adverse impacts, but that reasonable and practicable steps should be taken to reduce adverse noise impacts in the context of sustainable development and should ensure a balance between noise sensitivity and the requirement for noise generating developments.

3.2 BS 4142:2014

3.2.1 BS 4142:2014 '*Methods for rating and assessing industrial and commercial sound*' is the current British Standard providing guidance for assessment of noise impact from industrial and commercial sites. In general, the likelihood of adverse impact for a particular noise source is dependent upon several factors, including the margin by which it exceeds the background noise level, the character of the noise and the regularity with which it occurs. In previous versions of the Standard, the requirement was to consider the lowest measured background noise level. However, in recognition that this might lead to an unfair assessment of impact in some cases, the requirement is now to use the most representative background noise level.

3.2.2 The Standard recommends the determination of the 'rating level' of the specific source and advises a correction factor if the sound has a tonal quality, is intermittent or impulsive or has any other distinct characteristics that would make it more noticeable. The degree of impact is assessed by comparing the measured environmental background level with the rating level.

3.2.3 Where the rating level exceeds the background level, the level of impact is as follows:

i. Typically, the greater the difference between the background level and the rating level, the greater the magnitude of the impact;
ii. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
iii. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;

3.2.4 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. It is generally accepted that a rating level that is 10 dB below the background noise level will not cause 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.

3.2.5 The Standard also allows for an appropriate correction for the acoustic features present in the noise. A correction should be applied if one or more of the following features are present at the NSR:

i. The noise is of a tonal nature, i.e. it contains a distinguishable, discrete, continuous note such as whine, hiss, screech or hum;

ii. The noise is impulsive, i.e. it contains distinct impulses such as bangs, clicks, clatters, or thumps;

iii. The noise contains other characteristics that are neither tonal nor impulsive, but sufficiently irregular to attract attention.

3.2.6 It is important to note that the Standard states that the subjective prominence of the character of the specific sound and the extent to which the acoustically distinguishing characteristics will attract attention should be considered at the noise sensitive locations.

3.2.7 The Standard recommends that a tonality penalty of 2 dB should be applied for a tone which is just perceptible at the noise sensitive receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

3.2.8 When correcting for impulsivity, the penalty is given as 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

3.3 WHO Guidelines on Community Noise and BS 8233:2014

3.3.1 Guidance for suitable internal noise criteria can be taken from the World Health Organisation's (WHO) indoor guideline values for community noise and British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings'*. The WHO recommends internal levels of 35 dB $L_{Aeq,16hr}$ for daytime and 30 dB $L_{Aeq,8hr}$ at night. BS 8233 suggests similar design standards for internal noise levels in order to protect the amenity and quality of life of residents.

3.3.2 The WHO suggests that to protect the majority of people from being moderately annoyed by noise during the daytime, the sound pressure level in outdoor living areas should not exceed 50 dB L_{Aeq} for a steady, continuous noise.

3.3.3 The WHO guidelines recommend that, at night, the sound levels outside façades of living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax}, so that people may sleep with bedroom windows open. These values have been obtained by assuming that noise reduction from outside to inside with the window partly open is 15 dB. Again, BS 8233 suggests similar design standards or internal noise levels, recommending that individual noise events should not exceed 45 dB $L_{Amax\ (fast)}$ internally.

3.4 Camden Local Plan (2017) and Camden Planning Guidance (2018)

3.4.1 The London Borough of Camden City Council (the relevant Local Planning Authority for the current planning application) has put in place a policy which seeks to ensure that noise and vibration from proposed developments is appropriately considered and that noise sensitive receptors are not negatively impacted. The Council acknowledges that "*there is a proliferation of fixed machinery, such as air conditioning units in Camden's centres which cumulatively can have a harmful impact*".

3.4.2 The noise and vibration thresholds are set out in Appendix 3 of the Camden Local Plan. These are based on the effect levels described in the NPPF, which are summarised in Section 3.1 of this report.

3.4.3 With regards to vibration, the Council has set vibration limits in the form of vibration dose values (VDV) for different types of receivers, including dwellings, offices and workshops, for different times of the day. Due to the fact that the location of the NSR is in a different building to that on which the new plant is to be installed, it is highly unlikely that any vibration from the mechanical plant will have any impact at the NSR.

3.4.4 With regards to noise impact from industrial and commercial noise sources, the Local Plan makes reference to BS 4142 (see Section 3.2 of this report). It states that "*a 'Rating Level' of 10 dB below background (15 dB if tonal components are present should be considered as the design criterion)*". The rating level, by definition, includes the penalties for tonal components, and therefore it is possible that the 15 dB requirement is an error. Nonetheless, the noise levels applicable to proposed industrial and commercial developments, including plant and machinery, are summarised in Table C of the Local Plan, which has been reproduced in **Table 1**, below.

Table 1: Local Plan Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing NSR	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10 dB below background	'Rating level' between 9 dB below and 5 dB above background	'Rating level' greater than 5 dB above background
Dwellings	Outside bedroom window (façade)	Night	'Rating level' 10 dB below background and no events exceeding 57 dB L_{Amax}	'Rating level' between 9 dB below and 5 dB above background or noise events between 57 and 88 dB L_{Amax}	'Rating level' greater than 5 dB above background and/or events exceeding 88 dB L_{Amax}

4. MECHANICAL PLANT ('SPECIFIC SOURCE')

4.1 Details of New Mechanical Plant

4.1.1 The development includes the relocation of four condenser units that are currently inside a plant room on the roof, to be positioned outside the plant room, as well as the installation of three new condenser units. The positions of these plant are shown in **Figure 2**.

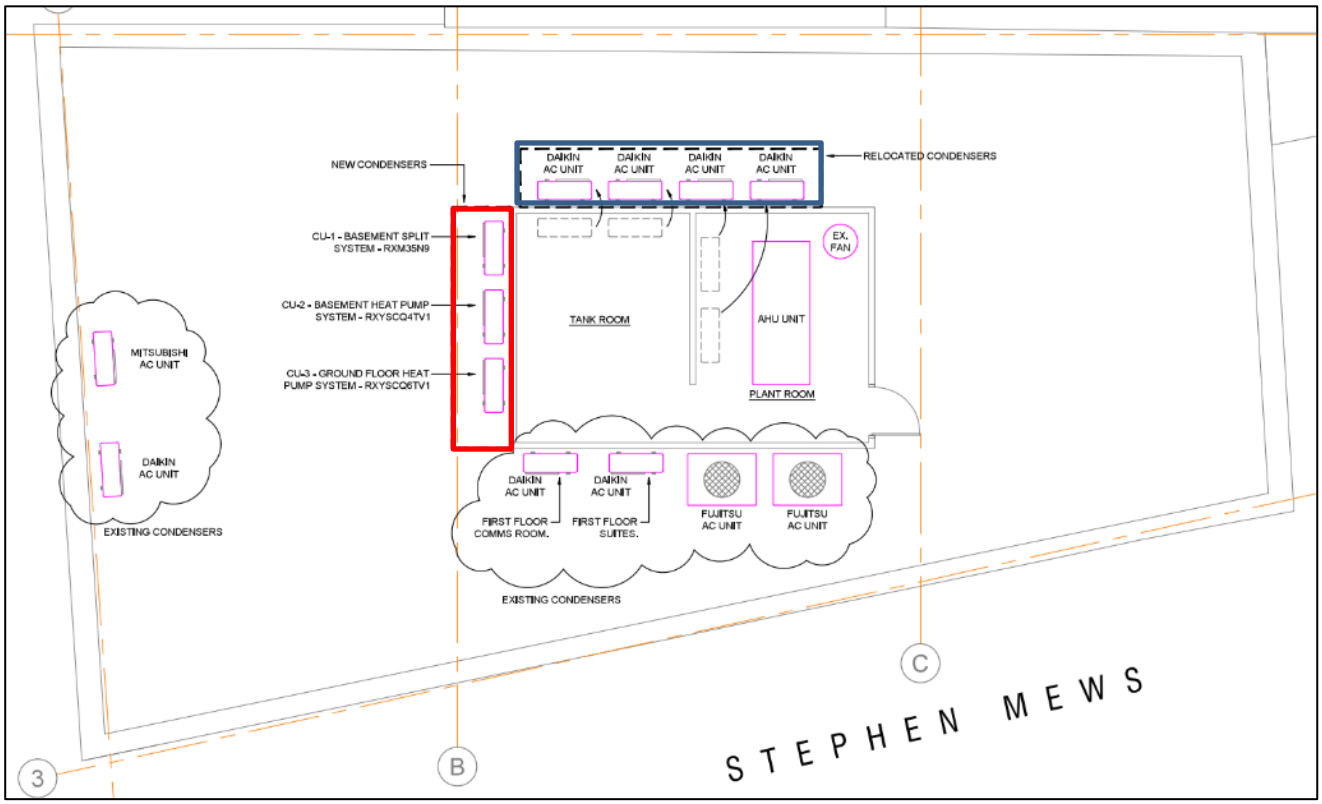

Figure 2: Position of relocated (blue) and new (red) mechanical plant on the roof of 10-11 Stephen Mews

4.1.2 The manufacturer's (Daikin) sound pressure level data (at 1 metre) for the seven condenser units is given in **Table 2**.

Table 2: Condenser sound pressure level data

Unit Model	No. of Units	Sound Pressure Levels (dBA per Octave Band)								Total dBA (1 Unit)
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Relocated Units										
RXS50G2V1B	1	20	31	35	37	37	35	27	17	**43**
RXS71FAV1B	3	26	39	44	48	47	42	39	33	**52**
New Units										
RXM35N9	1	27	38	42	46	45	41	37	27	**50**
RXYSCQ4TV1	1	23	37	40	48	47	41	34	24	**51**
RXYSCQ6TV1	1	28	39	43	49	48	44	38	28	**53**

4.2 Hours of Operation

4.2.1 It is not yet certain when each of the pieces of new mechanical plant will be in operation. While it is unlikely that they will all be in operation simultaneously at night, this has been considered as the potential worst case scenario for the purposes of this assessment.

5. 'BACKGROUND' NOISE SURVEY

5.1 Survey Description

5.1.1 As previously discussed, it would have been inappropriate to conduct a noise survey at present due to the government instruction to limit non-essential travel. Furthermore, any noise levels measured during this period of travel restriction are unlikely to have been representative. Therefore data from a noise survey that Hawkins carried out in the vicinity have been used. The details of the survey are given below.

5.1.2 Measurements were made to establish the prevailing noise climate, at a location approximately 80 metres south of 12 Percy Street, for a period of approximately 3 days between 19 and 22 July 2019. Measurements were undertaken on the roof of 25 Gresse Street. The measurement location relative to 10-11 Stephen Mews and 12 Percy Street is shown in **Figure 3**. The survey comprised automated logged measurements at a single fixed location. The dominant source of background noise at the measurement position was that of road traffic on Tottenham Court Road. Construction noise could also be heard in the distance.

5.1.3 The measurement commenced at approximately 10:30 hours on Friday 19 July 2019 and stopped at 04:00 hours on Monday 22 July 2019. This measurement period was chosen as the likelihood of noise impact is highest during night time hours and during daytime hours on a Sunday afternoon when residents are likely to be at home.

5.1.4 Instrumentation and weather details can be found at Appendix B. While there were some periods in which weather conditions were not optimal for measurement (see the highlighted data in Appendix B), exclusion of the sound level data measured

during these periods makes a no difference to both the minimum and representative background noise levels discussed below.

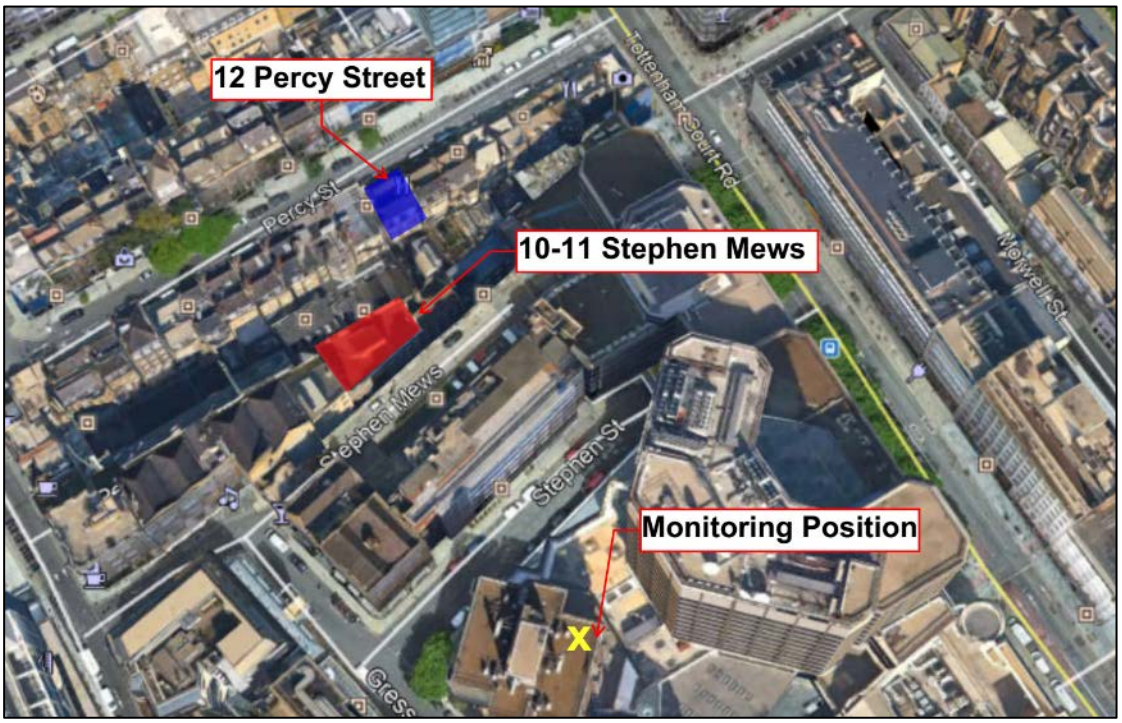

Figure 3: Location of noise monitoring (yellow X) relative to nearest 10-11 Stephen Mews and 12 Percy Street (NSR) © Google 2020

5.1.5 The monitoring location is shielded, in part, from the significant source of road traffic noise on Tottenham Court Road by the building located at 1 Stephen Street to the east. It is possible, therefore, that background noise levels at 12 Percy Street (which is not shielded) are slightly higher than those at the measurement location. Therefore using the monitoring data from 25 Gresse St will result in a conservative assessment of noise impact at 12 Percy Street.

5.2 Results of Data Logging

5.2.1 A summary of the data collected at the measurement position is displayed in **Figure 4**.

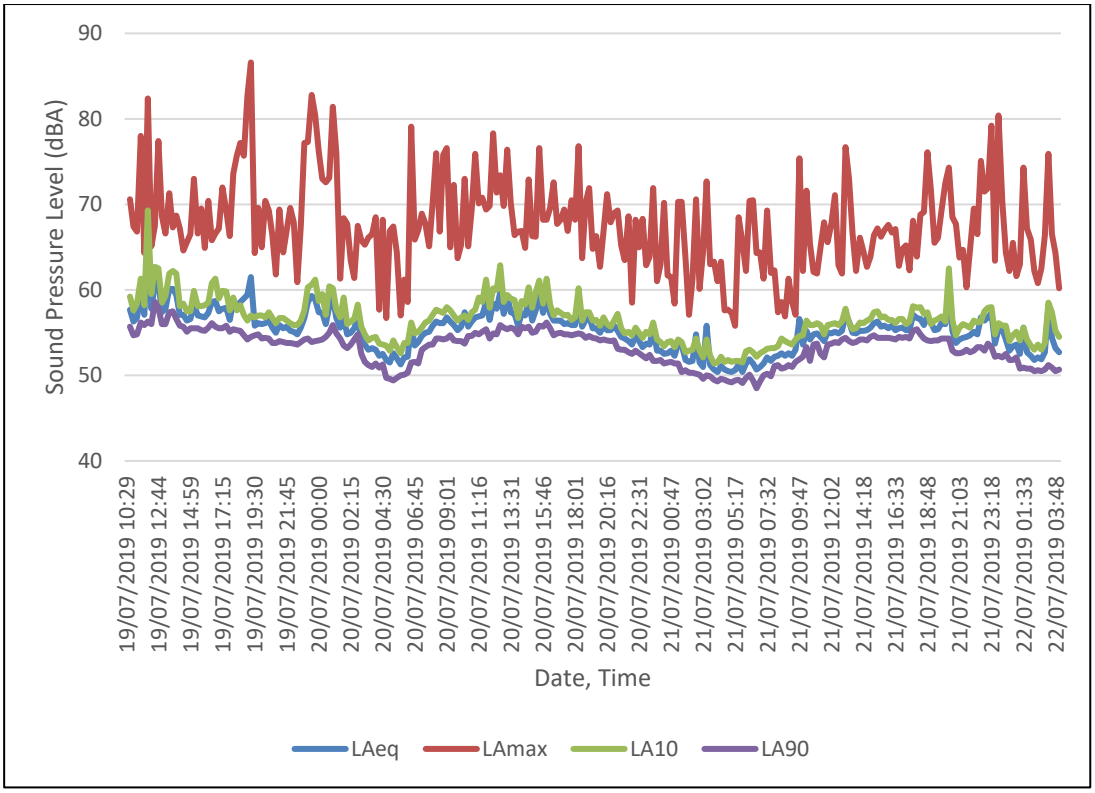

Figure 4: Results of data logging near the NSR

5.2.2 The measured data were used to determine the likely background noise levels, L_{A90}, at the nearest NSR during both daytime (07:00 to 23:00) and night time (23:00 to 07:00) hours.

5.2.3 At the measurement position, the $L_{A90,15min}$ was found to range between 49 and 59 dBA. Using the method suggested in paragraph 8.1.4 of BS 4142, the representative L_{A90} has been taken to be 54 dBA during day time hours and 51 dBA during night time hours. As the mechanical plant will potentially operate during both day time and night time hours, the target rating level has been taken to be 41 dBA, 10 dBA below the representative background noise level for night time hours.

5.2.4 It is worth noting that the noise level values frequently exceed the limit given in Table 1 for the LOAEL for night time given in the Camden Local Plan, as well as those recommended for noise levels outside bedroom windows and outdoor living

spaces given in the WHO Guidelines and BS 8233. This is typical in urban environments where noise from traffic (including sirens) and construction noise form part of the noise environment.

5.2.5 As the noise from the plant under assessment is generally continuous and lacks impulsive character, it is not expected to affect the existing L_{Amax} levels. Its effect on background noise levels is demonstrated in the following Section.

6. CALCULATIONS AND RATING LEVEL

6.1 Introduction

6.1.1 Noise rating levels at the NSR as a result of the operation of the proposed mechanical plant have been predicted by calculation. The following assumptions and corrections have been made:

i. All of the mechanical plant, both relocated and new, might, on occasion, run simultaneously;

ii. While tonality cannot be objectively established, as third octave data is not available for review, the noise produced by the units might be subjectively tonal. While the predicted noise level at the NSR due to the operation of the plant (as predicted in Section 6.2 of this report) is lower than the background noise level, and is therefore unlikely to be subjectively tonal, a 5 dB penalty has been added to the rating level as the Camden Local Plan places this penalty on noise which might be tonal. This results in a much stricter assessment of noise impact;

iii. The noise emitted by the units will be relatively continuous and is not considered to be impulsive;

iv. No barrier attenuation has been applied to the relocated condensers;

v. The monitoring location is shielded, in part, from the significant source of road traffic noise on Tottenham Court Road by the building located at 1 Stephen Street. It has been assumed that noise levels at 12 Percy Street will be the same as those at the measurement location (whereas in reality it is possible that they will be slightly higher). This results in a more stringent assessment of noise impact.

6.1.2 The above assumptions result in a conservative approach to the prediction of the noise levels at the nearest NSR; the actual resulting noise level from the plant at the position of the NSR is likely to be lower, and the actual background noise level higher, than that calculated in this assessment. In other words, the difference between the plant noise and the background noise is likely to be lower (and the impact will be lower) than is calculated in this assessment.

6.2 Results of Predictions

6.2.1 Noise levels measured at the monitoring location were used to calculate the likely representative L_{A90} at the NSR during night time hours. An L_{A90} at the NSR of 51 dBA has been used in this assessment. The target rating level has been taken to be 10 dBA below the representative L_{A90}, giving a target rating level of 41 dBA. A 5 dBA penalty has been included for possible tonality.

6.2.2 The details of the calculation of the rating level of both the relocated and new units operating simultaneously are given in **Table 3**, below.

Table 3: Rating Level prediction results

Item	Frequency (Hz)								Overall dB(A)	Comments
	63	125	250	500	1k	2k	4k	8k		
Relocated Units Sound Pressure Level										
RXS71FAV1B	26	39	44	48	47	42	39	33	**52**	Measured at 1 m over a reflective plane
RXS71FAV1B	26	39	44	48	47	42	39	33	**52**	
RXS71FAV1B	26	39	44	48	47	42	39	33	**52**	
RXS50G2V1B	20	31	35	37	37	35	27	17	**43**	
New Units Sound Pressure Level										
RXM35N9	27	38	42	46	45	41	37	27	**50**	Measured at 1 m over a reflective plane
RXYSCQ4TV1	23	37	40	48	47	41	34	24	**51**	
RXYSCQ6TV1	28	39	43	49	48	44	38	28	**53**	

Item	Frequency (Hz)								Overall dB(A)	Comments
	63	125	250	500	1k	2k	4k	8k		
Distance Attenuation										
RXS71FAV1B	-29	-29	-29	-29	-29	-29	-29	-29		At 28m
RXS71FAV1B	-28	-28	-28	-28	-28	-28	-28	-28		At 27m
RXS71FAV1B	-28	-28	-28	-28	-28	-28	-28	-28		At 25m
RXS50G2V1B	-28	-28	-28	-28	-28	-28	-28	-28		At 24m
RXM35N9	-29	-29	-29	-29	-29	-29	-29	-29		At 30m
RXYSCQ4TV1	-30	-30	-30	-30	-30	-30	-30	-30		At 30m
RXYSCQ6TV1	-30	-30	-30	-30	-30	-30	-30	-30		At 31m
Barrier Attenuation										
RXS71FAV1B	-	-	-	-	-	-	-	-		No barrier
RXS71FAV1B	-	-	-	-	-	-	-	-		No barrier
RXS71FAV1B	-	-	-	-	-	-	-	-		No barrier
RXS50G2V1B	-	-	-	-	-	-	-	-		No barrier
RXM35N9	-5	-6	-6	-6	-7	-8	-8	-8		Path difference> 0.1m
RXYSCQ4TV1	-9	-10	-12	-15	-18	-20	-23	-23		Path difference > 0.5m
RXYSCQ6TV1	-9	-10	-12	-15	-18	-20	-23	-23		Path difference > 0.5m
Directivity										
RXS71FAV1B	3	3	3	3	3	3	3	3		Q = 2
RXS71FAV1B	3	3	3	3	3	3	3	3		Q = 2
RXS71FAV1B	3	3	3	3	3	3	3	3		Q = 2
RXS50G2V1B	3	3	3	3	3	3	3	3		Q = 2
RXM35N9	0	0	0	0	0	0	0	0		Q = 1
RXYSCQ4TV1	0	0	0	0	0	0	0	0		Q = 1
RXYSCQ6TV1	0	0	0	0	0	0	0	0		Q = 1
Sound Pressure Level at NSR										
RXS71FAV1B	0	13	18	22	21	16	13	7	**26**	
RXS71FAV1B	0	13	19	22	22	17	14	7	**27**	
RXS71FAV1B	1	14	19	23	22	17	14	8	**27**	
RXS50G2V1B	-5	6	11	12	12	11	2	-8	**18**	
RXM35N9	-8	3	7	10	9	3	0	-10	**15**	
RXYSCQ4TV1	-16	-3	-1	3	-1	-9	-19	-29	**7**	

Item	Frequency (Hz)								Overall dB(A)	Comments
	63	125	250	500	1k	2k	4k	8k		
RXYSCQ6TV1	-11	-1	2	4	0	-5	-15	-25	**8**	
Total SPL at NSR	6	19	24	27	27	22	18	12	**32**	
Tonality	5	5	5	5	5	5	5	5	5	Possible tonality
Rating Level	**11**	**24**	**29**	**32**	**32**	**27**	**23**	**17**	**37**	**4 dB below Target Rating Level**

6.2.3 The calculated rating level of the condenser units operating simultaneously falls at least 4 dBA below the target rating level at the NSR (including tonality), and at least 14 dBA below the representative L_{A90}.

6.2.4 It is worth noting that, while a representative L_{A90} of 51 dBA has been used to inform the target rating level, the calculated rating level (including the 5 dBA penalty for tonality) of all plant in operation simultaneously also falls 12 dBA below the lowest measured $L_{A90,15min}$ value of 49 dBA.

7. UNCERTAINTY

7.1 The assessment methodology in BS 4142:2014 requires the issue of uncertainty to be taken into consideration. The Standard explains how to reduce the element of uncertainty through good practice. With regards to the measured data and calculations, uncertainty has been minimised as follows:

i. Measurement was conducted over a period encompassing the quietest periods of the day and night during which the plant might operate. The background noise levels for night time hours have been used to inform the target rating level to account for the time of highest potential impact;

ii. A measurement location was selected that was close to the nearest NSR. Weather data were logged at 5 minute intervals to ensure that adverse weather conditions that were likely to affect the noise level data could be identified. Data were analysed to ensure that these adverse weather conditions would not result in unrepresentative background noise levels;

iii. A suitable Class 1 sound level meter was used for the noise measurements. The meter complies with the relevant standards and has been calibrated at a UKAS accredited laboratory within the previous two years;

iv. Field calibration of the measurement system was performed on site at the start and end of each monitoring period. No significant calibration drift was noted;

v. While noise levels could not be measured at the NSR, the data used are from a site relatively nearby with the same dominant noise sources. The monitoring location for the collection of the data is shielded, in part, from the significant source of road traffic noise on Tottenham Court Road by the building located at 1 Stephen Street. It is possible, therefore, that noise levels at 12 Percy Street are slightly higher than those at the measurement location. This results in a more stringent assessment of noise impact than might be the case if the environmental noise levels had been measured at 12 Percy Street.

vi. While tonality has not been established, the noise emitted by the plant has been assumed to be subjectively tonal, triggering the application of the more stringent noise rating limit. In addition, a penalty of 5 dB has been used, rather than the 2 dB penalty for tonality that is just perceptible at the receiver (as suggested by BS 4142), as this is the penalty imposed on noise with character in the Camden Local Plan;

vii. While it is unlikely to occur, simultaneous operation of all mechanical plant (both relocated and new) has been considered. The resulting rating level has been compared against both the representative and lowest measured background noise levels.

8. CONCLUSIONS

8.1 An assessment of noise impact from the proposed new mechanical plant at 10-11 Stephen Mews, London, has been undertaken. The assessment is in accordance with the National Planning Policy Framework, BS 4142 and the Camden Local Plan.

8.2 A conservative approach has been used in the prediction of the rating level of the new plant at the nearest NSR. The noise rating level at the NSR as a result of all mechanical plant in simultaneous operation has been calculated. This rating level, including a 5 dB penalty for tonality, falls below the target rating level, and more than 10 dBA below the representative background noise level for night time hours. It is therefore considered unlikely that the noise from the relocated and new mechanical plant will result in adverse impact and is likely to be of the Lowest Observed Adverse Effect Level, as defined by the National Planning Policy Framework and the Camden Local Plan.

8.3 Uncertainty in measurement and calculation has been considered and minimised where possible and is not expected to influence the conclusion of the noise impact study.

APPENDIX A

Glossary of Terms

Appendix A

Glossary of Terms

Term	Symbol	Description
Decibel	***dB***	A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square of a given sound field and a reference pressure level (20 x 10^{-5}Pa – Threshold of hearing)
A-Weighted Decibel	***dBA***	A-weighting is a correction factor applied to decibel values in order to give a more accurate representation of human hearing which compensates for the varying sensitivity of the human ear with frequency
Equivalent continuous A-weighted sound pressure level	$L_{Aeq,T}$	The value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, *T*, has the same mean-squared sound pressure as the sound under consideration that varies with time
Background Noise Level	$L_{A90,T}$	The sound level exceeded 90% of the time. Typically used to describe background noise, this is regarded as the 'average minimum level' and quantifies the common sound level of a fluctuating sound field within a specified time interval, *T*.
Maximum A-weighted sound pressure level	L_{Amax}	The maximum A-weighted sound pressure level. This effectively describes the highest noise level recorded at an instant in time, over a given time period. It is used to measure individual, short lived noise events that may not have a significant effect on the L_{Aeq} of that period.
Octave band	**-**	A band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Rating Level	$L_{Ar,T}$	The specific sound level plus any adjustment for the characteristic features of the sound

APPENDIX B

Measurement Equipment and Meteorological Conditions

Appendix B

Measurement Equipment and Meteorological Conditions

Table B1: Measurement Equipment

Equipment	Serial Number	Calibration Due (at time of Measurement)
Norsonic 118 Class 1 Integrating Sound Level Meter	28953	March 2020
Bruel & Kjaer 4230 Field Calibrator	1558650	March 2020
GRAS GRA-41AL Outdoor Microphone	44957	-

Test equipment was field calibrated before and after measurement. No significant drift was revealed by field calibration.

Table B2: Weather Data

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
19/07/2019 11:01:04	19.1	64	2.4	S	0
19/07/2019 11:06:04	18.9	64	3.1	SW	0
19/07/2019 11:11:04	19	64	3.7	ENE	0
19/07/2019 11:16:04	18.9	64	4.4	SW	0
19/07/2019 11:21:04	18.6	67	4.8	SW	0
19/07/2019 11:26:04	17.3	75	8.2	S	0
19/07/2019 11:31:04	16.8	80	4.4	S	0
19/07/2019 11:36:04	16.6	82	4.4	SW	0
19/07/2019 11:41:04	16.5	83	4.1	S	0
19/07/2019 11:46:04	16.3	83	3.7	S	0
19/07/2019 11:51:04	16.3	85	2.4	S	0
19/07/2019 11:56:04	16.1	84	3.7	N	0
19/07/2019 12:01:04	16.1	85	2	S	0
19/07/2019 12:06:04	16.2	86	1.7	S	0
19/07/2019 12:11:04	16.3	85	3.7	S	0
19/07/2019 12:16:04	16.3	85	3.1	ESE	0
19/07/2019 12:21:04	16.4	86	2.7	SW	0
19/07/2019 12:26:04	16.5	86	2.7	S	0
19/07/2019 12:31:04	16.6	86	4.8	S	0
19/07/2019 12:36:04	16.7	86	5.1	NW	0
19/07/2019 12:41:04	16.8	87	2	SW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
19/07/2019 12:46:04	17	86	4.1	SW	0
19/07/2019 12:51:04	17	86	4.1	SW	0
19/07/2019 12:56:04	17	86	5.4	SW	1.8
19/07/2019 13:01:04	17.2	87	3.4	SW	0
19/07/2019 13:06:04	17.3	87	4.1	S	0
19/07/2019 13:11:04	17.1	86	3.7	W	0
19/07/2019 13:16:04	17.1	86	2.4	SW	0
19/07/2019 13:21:04	17.2	87	4.1	S	0
19/07/2019 13:26:04	17.3	87	5.1	S	0.3
19/07/2019 13:31:04	17.3	85	5.4	S	0.6
19/07/2019 13:36:04	17.3	85	3.7	S	0.6
19/07/2019 13:41:04	17.2	85	6.1	S	0.6
19/07/2019 13:46:04	17.2	86	5.4	SSW	0.6
19/07/2019 13:51:04	17.2	87	4.1	S	0.6
19/07/2019 13:56:04	17.2	88	3.4	W	0.6
19/07/2019 14:01:04	17.1	88	4.1	S	0
19/07/2019 14:06:04	17.1	89	3.4	S	0
19/07/2019 14:11:04	17.2	88	5.8	SW	0
19/07/2019 14:16:04	17.4	88	2.7	W	0
19/07/2019 14:21:04	17.5	85	4.8	S	0
19/07/2019 14:26:04	17.6	84	4.8	NW	0
19/07/2019 14:31:04	17.6	84	3.7	S	0
19/07/2019 14:36:04	17.7	84	4.9	NE	0
19/07/2019 14:41:04	17.8	84	3.1	S	0
19/07/2019 14:46:04	17.9	84	3.4	SE	0
19/07/2019 14:51:04	18	84	1.7	S	0
19/07/2019 14:56:04	18	83	4.4	S	0
19/07/2019 15:01:04	18.2	83	3.7	SW	0
19/07/2019 15:06:04	18.2	83	3.4	SSW	0
19/07/2019 15:11:04	18.3	83	3.4	SE	0
19/07/2019 15:16:04	18.4	83	3.4	S	0
19/07/2019 15:21:04	18.5	82	3.1	SW	0
19/07/2019 15:26:04	18.7	82	2	S	0
19/07/2019 15:31:04	18.8	82	4.9	SSW	0
19/07/2019 15:36:04	18.7	82	4.8	SW	0
19/07/2019 15:41:04	18.7	82	3.4	SW	0
19/07/2019 15:46:04	18.9	82	3.1	SW	0
19/07/2019 15:51:04	18.7	82	4.1	S	0
19/07/2019 15:56:04	18.6	83	4.1	S	0
19/07/2019 16:01:04	18.5	84	5.1	SSW	0
19/07/2019 16:06:04	18.5	84	2.7	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
19/07/2019 16:11:04	18.6	83	3.1	SW	0
19/07/2019 16:16:04	18.6	83	3.7	S	0
19/07/2019 16:21:04	18.7	83	4.1	SW	0
19/07/2019 16:26:04	18.7	83	5.4	SSW	0
19/07/2019 16:31:04	18.8	83	3.1	S	0
19/07/2019 16:36:04	18.9	82	3.7	SW	0
19/07/2019 16:41:04	19.1	81	2.7	SSW	0
19/07/2019 16:46:04	19.1	81	3.7	SW	0
19/07/2019 16:51:04	19.2	81	5.4	SSW	0
19/07/2019 16:56:04	19.1	80	4.1	S	0
19/07/2019 17:01:04	19.3	80	2.4	S	0
19/07/2019 17:06:04	19.3	80	4.4	S	0
19/07/2019 17:11:04	19.2	80	2	S	0
19/07/2019 17:16:04	19.2	80	3.1	SW	0
19/07/2019 17:21:04	19.3	80	6.1	S	0
19/07/2019 17:26:04	19.3	80	2	S	0
19/07/2019 17:31:04	19.3	80	4.4	SE	0
19/07/2019 17:36:04	19.2	81	5.1	S	0
19/07/2019 17:41:04	19.2	81	2.4	SW	0
19/07/2019 17:46:04	19.3	81	3.7	SSE	0
19/07/2019 17:51:04	19.2	81	3.1	SSW	0
19/07/2019 17:56:04	19.2	81	4.1	W	0
19/07/2019 18:01:04	19.3	81	2.7	SW	0
19/07/2019 18:06:04	19.3	81	2.7	S	0
19/07/2019 18:11:04	19.2	81	3.7	S	0
19/07/2019 18:16:04	19.2	82	3.1	SSW	0
19/07/2019 18:21:04	19.1	82	3.7	S	0
19/07/2019 18:26:04	19.1	82	4.1	WNW	0
19/07/2019 18:31:04	19	83	4.1	S	0
19/07/2019 18:36:04	19.1	83	2.4	SW	0
19/07/2019 18:41:04	19.1	84	2	SW	0
19/07/2019 18:46:04	19.1	84	3.1	S	0
19/07/2019 18:51:04	19	84	3.4	SW	0
19/07/2019 18:56:04	18.9	85	4.8	S	0
19/07/2019 19:01:04	18.8	87	3.4	S	0
19/07/2019 19:06:04	18.7	88	2.4	S	0
19/07/2019 19:11:04	18.8	89	3.4	SW	0
19/07/2019 19:16:04	18.8	89	4.4	SW	0
19/07/2019 19:21:04	18.8	90	2.4	SW	0
19/07/2019 19:26:04	18.8	89	3.4	SW	0
19/07/2019 19:31:04	18.9	90	3.4	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
19/07/2019 19:36:04	18.9	89	2.4	SW	0
19/07/2019 19:41:04	19	89	3.7	SW	0
19/07/2019 19:46:04	19	88	2.4	S	0
19/07/2019 19:51:04	19	88	4.4	SW	0
19/07/2019 19:56:04	19	88	3.4	SSW	0
19/07/2019 20:01:04	19	88	4.1	S	0
19/07/2019 20:06:04	19	88	4.4	SW	0
19/07/2019 20:11:04	19	88	4.4	S	0
19/07/2019 20:16:04	19	88	3.1	SW	0
19/07/2019 20:21:04	18.9	88	3.4	S	0
19/07/2019 20:26:04	18.9	88	3.7	S	0
19/07/2019 20:31:04	18.9	88	2	SW	0
19/07/2019 20:36:04	18.9	88	4.1	S	0
19/07/2019 20:41:04	18.9	88	2.4	S	0
19/07/2019 20:46:04	18.9	87	4.4	S	0
19/07/2019 20:51:04	18.9	87	3.1	SW	0
19/07/2019 20:56:04	18.9	87	2.4	S	0
19/07/2019 21:01:04	18.9	87	3.4	S	0
19/07/2019 21:06:04	18.9	87	1.7	SW	0
19/07/2019 21:11:04	18.9	86	4.1	S	0
19/07/2019 21:16:04	18.9	86	3.4	SW	0
19/07/2019 21:21:04	18.9	86	2.4	S	0
19/07/2019 21:26:04	18.9	85	2.7	S	0
19/07/2019 21:31:04	18.9	85	5.4	S	0
19/07/2019 21:36:04	18.9	85	2.4	S	0
19/07/2019 21:41:04	18.8	85	3.7	S	0
19/07/2019 21:46:04	18.8	85	4.4	S	0
19/07/2019 21:51:04	18.8	85	2.4	S	0
19/07/2019 21:56:04	18.8	85	4.1	S	0.3
19/07/2019 22:01:04	18.8	86	2.4	S	0
19/07/2019 22:06:04	18.8	86	3.4	S	0
19/07/2019 22:11:04	18.7	86	3.4	SW	0
19/07/2019 22:16:04	18.7	86	2.7	SW	0
19/07/2019 22:21:04	18.7	86	5.1	SW	0
19/07/2019 22:26:04	18.7	86	3.7	SW	0
19/07/2019 22:31:04	18.7	86	3.1	SW	0
19/07/2019 22:36:04	18.7	86	2.7	S	0
19/07/2019 22:41:04	18.7	87	3.4	S	0
19/07/2019 22:46:04	18.6	87	4.1	S	0
19/07/2019 22:51:04	18.6	87	3.1	SW	0
19/07/2019 22:56:04	18.6	87	2.7	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
19/07/2019 23:01:04	18.6	87	1.4	S	0
19/07/2019 23:06:04	18.6	87	2.4	S	0
19/07/2019 23:11:04	18.6	87	3.4	SW	0
19/07/2019 23:16:04	18.6	87	3.7	SW	0
19/07/2019 23:21:04	18.6	87	3.1	S	0
19/07/2019 23:26:04	18.5	87	2	S	0
19/07/2019 23:31:04	18.5	87	1	SW	0
19/07/2019 23:36:04	18.5	88	2	S	0
19/07/2019 23:41:04	18.5	88	2.7	S	0
19/07/2019 23:46:04	18.5	88	2	SW	0
19/07/2019 23:51:04	18.4	88	4.1	SW	0
19/07/2019 23:56:04	18.3	89	3.4	SW	0.3
20/07/2019 00:01:04	18.3	89	3.7	S	0
20/07/2019 00:06:04	18.3	90	3.7	S	0
20/07/2019 00:11:04	18.2	90	2	SW	0
20/07/2019 00:16:04	18.2	90	2	SSW	0
20/07/2019 00:21:04	18.1	89	2.7	S	0
20/07/2019 00:26:04	18	89	3.1	S	0
20/07/2019 00:31:04	18	88	3.4	S	0
20/07/2019 00:36:04	17.9	88	1.4	SW	0
20/07/2019 00:41:04	17.9	89	3.4	SW	0
20/07/2019 00:46:04	17.8	90	2	S	0
20/07/2019 00:51:04	17.7	91	2.4	S	0
20/07/2019 00:56:04	17.6	92	4.1	SW	0
20/07/2019 01:01:04	17.6	93	2	S	0
20/07/2019 01:06:04	17.6	93	4.1	S	0
20/07/2019 01:11:04	17.6	93	4.1	S	0
20/07/2019 01:16:04	17.6	94	2.4	SW	1.2
20/07/2019 01:21:04	17.5	94	3.1	SW	1.8
20/07/2019 01:26:04	17.5	93	2.4	SW	1.8
20/07/2019 01:31:04	17.5	93	3.1	S	2.1
20/07/2019 01:36:04	17.5	93	3.1	SW	2.4
20/07/2019 01:41:04	17.5	92	2.7	SW	2.7
20/07/2019 01:46:04	17.4	95	2	SW	2.7
20/07/2019 01:51:04	17.4	95	2	SW	2.7
20/07/2019 01:56:04	17.5	93	2.4	NW	3
20/07/2019 02:01:04	17.5	94	2.4	SW	0.3
20/07/2019 02:06:04	17.4	97	2.4	SW	0.3
20/07/2019 02:11:04	17.4	97	2.4	S	0.6
20/07/2019 02:16:04	17.4	96	3.7	S	0.9
20/07/2019 02:21:04	17.3	96	3.1	SSW	1.2

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 02:26:04	17.3	95	3.1	S	1.5
20/07/2019 02:31:04	17.3	96	1.7	SW	0
20/07/2019 02:36:04	17.2	95	3.4	S	0
20/07/2019 02:41:04	17.2	95	3.7	SW	0
20/07/2019 02:46:04	17.1	95	1.7	S	0
20/07/2019 02:51:04	17	95	1.4	SW	0
20/07/2019 02:56:04	17	95	0.7	SW	0
20/07/2019 03:01:04	17	96	1	S	0
20/07/2019 03:06:04	17	96	1	S	0
20/07/2019 03:11:04	17	96	1.4	SW	0
20/07/2019 03:16:04	17.1	95	1.7	SW	0
20/07/2019 03:21:04	17.1	95	1.4	S	0
20/07/2019 03:26:04	17.1	95	0.7	S	0
20/07/2019 03:31:04	17.1	95	0.7	NE	0
20/07/2019 03:36:04	17.1	96	1.7	S	0
20/07/2019 03:41:04	17.1	96	1	NW	0
20/07/2019 03:46:04	17.1	96	3.4	SW	0
20/07/2019 03:51:04	17.1	95	2.4	SW	0
20/07/2019 03:56:04	17.1	95	2	S	0
20/07/2019 04:01:04	17.1	95	1.7	S	0
20/07/2019 04:06:04	17.1	95	2.7	SW	0
20/07/2019 04:11:04	17	94	2.7	SSW	0
20/07/2019 04:16:04	17	94	2	SW	0
20/07/2019 04:21:04	16.9	94	2.4	SW	0
20/07/2019 04:26:04	16.9	94	3.1	S	0
20/07/2019 04:31:04	16.9	93	2.4	S	0
20/07/2019 04:36:04	16.9	93	3.4	SW	0
20/07/2019 04:41:04	16.8	92	2.4	S	0
20/07/2019 04:46:04	16.8	92	2.4	S	0
20/07/2019 04:51:04	16.8	92	2.4	SW	0
20/07/2019 04:56:04	16.8	91	1.7	SW	0
20/07/2019 05:01:04	16.7	91	2.4	SW	0
20/07/2019 05:06:04	16.7	91	0.7	S	0
20/07/2019 05:11:04	16.7	91	2.7	SSW	0
20/07/2019 05:16:04	16.6	91	2.4	S	0
20/07/2019 05:21:04	16.6	91	2.7	SW	0
20/07/2019 05:26:04	16.6	91	2	S	0
20/07/2019 05:31:04	16.6	91	3.7	S	0
20/07/2019 05:36:04	16.5	91	1.4	SW	0
20/07/2019 05:41:04	16.5	91	1.4	SSW	0
20/07/2019 05:46:04	16.5	91	3.7	SW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 05:51:04	16.5	92	2	S	0
20/07/2019 05:56:04	16.5	92	3.7	S	0
20/07/2019 06:01:04	16.5	92	3.4	SSW	0
20/07/2019 06:06:04	16.5	92	3.7	SW	0
20/07/2019 06:11:04	16.5	93	2.7	S	0
20/07/2019 06:16:04	16.6	93	2.7	S	0
20/07/2019 06:21:04	16.6	93	2.4	S	0
20/07/2019 06:26:04	16.6	94	1.7	SW	0.6
20/07/2019 06:31:04	16.5	95	2	SW	0.9
20/07/2019 06:36:04	16.6	95	3.1	SW	1.2
20/07/2019 06:41:04	16.7	96	3.1	SW	2.1
20/07/2019 06:46:04	16.7	97	2.4	S	2.1
20/07/2019 06:51:04	16.8	97	2	SW	2.1
20/07/2019 06:56:04	16.8	97	1	SE	2.1
20/07/2019 07:01:04	16.9	96	1.7	SW	0.3
20/07/2019 07:06:04	17	96	2.4	S	0.3
20/07/2019 07:11:04	17.1	96	2.4	SW	0.3
20/07/2019 07:16:04	17.3	95	2.7	SW	0.3
20/07/2019 07:21:04	17.4	94	3.1	SE	0.3
20/07/2019 07:26:04	17.4	93	1.7	SW	0.3
20/07/2019 07:31:04	17.6	91	2	S	0.3
20/07/2019 07:36:04	17.7	90	3.4	S	0.3
20/07/2019 07:41:04	17.8	90	3.7	SW	0.3
20/07/2019 07:46:04	17.9	90	2	S	0.3
20/07/2019 07:51:04	17.9	89	2.4	SSW	0.3
20/07/2019 07:56:04	17.9	89	3.7	S	0.3
20/07/2019 08:01:04	17.9	90	1.7	S	0
20/07/2019 08:06:04	17.9	90	2.4	S	0
20/07/2019 08:11:04	18	90	3.1	SE	0
20/07/2019 08:16:04	18	90	2	SW	0
20/07/2019 08:21:04	18.1	89	2.4	SSE	0
20/07/2019 08:26:04	18.1	88	3.7	S	0
20/07/2019 08:31:04	18.2	88	2	S	0
20/07/2019 08:36:04	18.3	88	2.7	SSW	0
20/07/2019 08:41:04	18.5	87	3.1	S	0
20/07/2019 08:46:04	18.7	85	2.4	SW	0
20/07/2019 08:51:04	18.7	85	3.1	S	0
20/07/2019 08:56:04	18.9	85	1.4	S	0
20/07/2019 09:01:04	19	83	2.7	S	0
20/07/2019 09:06:04	19.1	83	1.7	SSW	0
20/07/2019 09:11:04	19.5	81	1.7	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 09:16:04	19.8	81	2	SSW	0
20/07/2019 09:21:04	19.9	78	4.8	S	0
20/07/2019 09:26:04	19.8	79	2.7	S	0
20/07/2019 09:31:04	19.7	79	2.7	S	0
20/07/2019 09:36:04	19.6	80	2	S	0
20/07/2019 09:41:04	19.6	80	1	S	0
20/07/2019 09:46:04	19.9	80	1.7	E	0
20/07/2019 09:51:04	20.1	78	3.1	SE	0
20/07/2019 09:56:04	20.2	78	2.4	SW	0
20/07/2019 10:01:04	20.4	76	1	SSE	0
20/07/2019 10:06:04	20.7	75	4.8	SW	0
20/07/2019 10:11:04	20.6	73	3.7	SE	0
20/07/2019 10:16:04	20.7	74	1	W	0
20/07/2019 10:21:04	21.5	72	3.4	SW	0
20/07/2019 10:26:04	21.8	71	2	S	0
20/07/2019 10:31:04	22.3	70	1.4	NW	0
20/07/2019 10:36:04	22.2	68	2	S	0
20/07/2019 10:41:04	22.9	63	1.4	W	0
20/07/2019 10:46:04	23.4	61	1.7	SW	0
20/07/2019 10:51:04	23.7	60	4.4	SW	0
20/07/2019 10:56:04	23.4	60	1.4	SW	0
20/07/2019 11:01:04	23.2	59	4.4	S	0
20/07/2019 11:06:04	23.1	60	2.4	E	0
20/07/2019 11:11:04	23.9	58	2.7	W	0
20/07/2019 11:16:04	23.8	58	2.4	SSE	0
20/07/2019 11:21:04	23.4	57	4.4	S	0
20/07/2019 11:26:04	23.1	58	2.4	S	0
20/07/2019 11:31:04	23.5	58	2.7	SSW	0
20/07/2019 11:36:04	24.1	55	3.1	S	0
20/07/2019 11:41:04	23.2	58	1.7	W	0
20/07/2019 11:46:04	21.9	65	3.1	NW	0
20/07/2019 11:51:04	21.2	68	3.1	W	0
20/07/2019 11:56:04	21	69	2	E	0
20/07/2019 12:01:04	20.7	69	3.1	NNW	0
20/07/2019 12:06:04	20.6	70	2.4	W	0
20/07/2019 12:11:04	20.3	70	3.1	S	0
20/07/2019 12:16:04	20.3	70	5.1	SSW	0
20/07/2019 12:21:04	20.7	69	2	S	0
20/07/2019 12:26:04	21.5	66	2	S	0
20/07/2019 12:31:04	22.1	64	4.4	S	0
20/07/2019 12:36:04	22.7	61	1.4	SE	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 12:41:04	22.9	59	2.4	S	0
20/07/2019 12:46:04	23.3	60	2	N	0
20/07/2019 12:51:04	23.4	59	2.4	S	0
20/07/2019 12:56:04	23.6	60	2	E	0
20/07/2019 13:01:04	23.4	58	2.4	S	0
20/07/2019 13:06:04	23.6	58	4.4	SE	0
20/07/2019 13:11:04	24.1	55	5.1	WNW	0
20/07/2019 13:16:04	24.1	54	5.1	S	0
20/07/2019 13:21:04	24.5	55	2.7	SW	0
20/07/2019 13:26:04	24.2	54	3.1	S	0
20/07/2019 13:31:04	23.4	56	3.7	S	0
20/07/2019 13:36:04	24.2	55	2.7	S	0
20/07/2019 13:41:04	24.6	51	3.1	E	0
20/07/2019 13:46:04	23.9	51	2	S	0
20/07/2019 13:51:04	23.6	52	2.4	W	0
20/07/2019 13:56:04	23.3	52	2.7	NW	0
20/07/2019 14:01:04	22.9	52	3.4	SW	0
20/07/2019 14:06:04	22.8	52	2.4	W	0
20/07/2019 14:11:04	23.3	51	3.1	SSW	0
20/07/2019 14:16:04	24.3	50	3.4	W	0
20/07/2019 14:21:04	24.7	46	5.1	S	0
20/07/2019 14:26:04	25	44	4.1	NE	0
20/07/2019 14:31:04	25.1	45	1.4	S	0
20/07/2019 14:36:04	26	44	1	E	0
20/07/2019 14:41:04	25.7	42	3.1	SW	0
20/07/2019 14:46:04	25.1	42	2.4	SE	0
20/07/2019 14:51:04	25.6	41	3.4	S	0
20/07/2019 14:56:04	25.7	40	2.4	NW	0
20/07/2019 15:01:04	25.2	40	2.4	WSW	0
20/07/2019 15:06:04	24.8	41	3.4	S	0
20/07/2019 15:11:04	25.8	41	1.4	NW	0
20/07/2019 15:16:04	26.3	39	2.4	W	0
20/07/2019 15:21:04	26.1	40	2	SE	0
20/07/2019 15:26:04	25.6	40	3.1	S	0
20/07/2019 15:31:04	25	41	3.1	N	0
20/07/2019 15:36:04	24.7	42	1.7	N	0
20/07/2019 15:41:04	24.3	42	2.7	S	0
20/07/2019 15:46:04	24.6	42	3.1	S	0
20/07/2019 15:51:04	24.8	41	2	N	0
20/07/2019 15:56:04	25.1	40	2	N	0
20/07/2019 16:01:04	25.1	40	1.7	SW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 16:06:04	25.5	40	3.1	N	0
20/07/2019 16:11:04	25.1	40	4.1	SSW	0
20/07/2019 16:16:04	24.9	40	3.1	SSW	0
20/07/2019 16:21:04	25.2	41	3.1	NNE	0
20/07/2019 16:26:04	24.8	41	2.4	NE	0
20/07/2019 16:31:04	24.7	43	4.8	NE	0
20/07/2019 16:36:04	24.5	44	3.1	NE	0
20/07/2019 16:41:04	25	43	1.7	NW	0
20/07/2019 16:46:04	24.9	43	2.4	NW	0
20/07/2019 16:51:04	25.4	42	3.7	NW	0
20/07/2019 16:56:04	25.1	42	3.4	SW	0
20/07/2019 17:01:04	25.3	42	5.1	E	0
20/07/2019 17:06:04	25.1	42	2	NW	0
20/07/2019 17:11:04	24.4	43	3.4	NW	0
20/07/2019 17:16:04	24.6	44	2.4	NE	0
20/07/2019 17:21:04	24.6	44	2.7	NW	0
20/07/2019 17:26:04	24.5	44	3.1	N	0
20/07/2019 17:31:04	24.6	44	2.7	NW	0
20/07/2019 17:36:04	24.7	43	3.4	SW	0
20/07/2019 17:41:04	24.8	43	3.1	NW	0
20/07/2019 17:46:04	24.5	43	3.7	N	0
20/07/2019 17:51:04	24.6	44	3.4	N	0
20/07/2019 17:56:04	24.4	44	2.7	W	0
20/07/2019 18:01:04	24.7	43	2.7	N	0
20/07/2019 18:06:04	24.6	44	2.7	SE	0
20/07/2019 18:11:04	24.7	44	2.4	NNE	0
20/07/2019 18:16:04	24.7	43	3.1	WNW	0
20/07/2019 18:21:04	24.6	44	5.1	W	0
20/07/2019 18:26:04	24.3	45	2.7	N	0
20/07/2019 18:31:04	24.4	44	3.1	W	0
20/07/2019 18:36:04	24.4	43	2.7	N	0
20/07/2019 18:41:04	24	44	2.7	NW	0
20/07/2019 18:46:04	24	44	2.4	E	0
20/07/2019 18:51:04	23.9	45	1.7	SW	0
20/07/2019 18:56:04	24.1	44	3.1	NE	0
20/07/2019 19:01:04	23.3	45	3.7	NE	0
20/07/2019 19:06:04	23.1	45	2	NW	0
20/07/2019 19:11:04	23	45	3.7	E	0
20/07/2019 19:16:04	22.7	46	2.4	SW	0
20/07/2019 19:21:04	22.6	46	3.7	NW	0
20/07/2019 19:26:04	22.6	47	3.1	N	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 19:31:04	23.1	45	3.7	E	0
20/07/2019 19:36:04	23.4	45	2.7	N	0
20/07/2019 19:41:04	23.7	45	2	N	0
20/07/2019 19:46:04	23.6	44	2.7	NW	0
20/07/2019 19:51:04	23.4	45	4.4	NW	0
20/07/2019 19:56:04	23.4	45	2.4	NW	0
20/07/2019 20:01:04	23.5	45	2.7	WNW	0
20/07/2019 20:06:04	23.3	45	2.4	W	0
20/07/2019 20:11:04	23.2	46	2.7	NW	0
20/07/2019 20:16:04	23	46	2	SE	0
20/07/2019 20:21:04	23	46	1	N	0
20/07/2019 20:26:04	22.5	47	1.4	E	0
20/07/2019 20:31:04	22.5	47	2	NW	0
20/07/2019 20:36:04	22.5	47	0.7	N	0
20/07/2019 20:41:04	22	50	2	NW	0
20/07/2019 20:46:04	21.5	51	4.4	N	0
20/07/2019 20:51:04	21.1	52	2.4	N	0
20/07/2019 20:56:04	20.9	52	2.4	SW	0
20/07/2019 21:01:04	20.8	52	1.7	WNW	0
20/07/2019 21:06:04	20.8	53	1.4	SW	0
20/07/2019 21:11:04	20.6	53	1.7	SE	0
20/07/2019 21:16:04	20.6	53	1.4	SW	0
20/07/2019 21:21:04	20.5	54	2	N	0
20/07/2019 21:26:04	20.5	54	1	NW	0
20/07/2019 21:31:04	20.4	54	2	NW	0
20/07/2019 21:36:04	20.3	55	0.7	N	0
20/07/2019 21:41:04	20.2	55	1	NE	0
20/07/2019 21:46:04	20.1	55	2.7	N	0
20/07/2019 21:51:04	20	56	1.4	WSW	0
20/07/2019 21:56:04	19.9	56	1	W	0
20/07/2019 22:01:04	19.8	57	2	NW	0
20/07/2019 22:06:04	19.8	58	1.4	NE	0
20/07/2019 22:11:04	19.7	59	1	NNE	0
20/07/2019 22:16:04	19.7	59	1.4	W	0
20/07/2019 22:21:04	19.6	59	1.4	SW	0
20/07/2019 22:26:04	19.5	59	0.7	W	0
20/07/2019 22:31:04	19.4	60	1.7	SW	0
20/07/2019 22:36:04	19.4	60	2	NE	0
20/07/2019 22:41:04	19.3	60	1.4	NNW	0
20/07/2019 22:46:04	19.3	60	1	NW	0
20/07/2019 22:51:04	19.2	60	0.7	NW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
20/07/2019 22:56:04	19.1	61	1.7	SW	0
20/07/2019 23:01:04	19	62	2	NW	0
20/07/2019 23:06:04	18.9	62	3.1	NW	0
20/07/2019 23:11:04	18.8	63	1.4	N	0
20/07/2019 23:16:04	18.7	64	3.1	NW	0
20/07/2019 23:21:04	18.5	64	3.1	W	0
20/07/2019 23:26:04	18.4	65	2.4	NW	0
20/07/2019 23:31:04	18.3	66	2	E	0
20/07/2019 23:36:04	18.2	66	2.4	W	0
20/07/2019 23:41:04	18.1	67	1.7	NW	0
20/07/2019 23:46:04	18	67	2	NNW	0
20/07/2019 23:51:04	17.9	68	1.4	WSW	0
20/07/2019 23:56:04	17.9	68	1.7	NW	0
21/07/2019 00:01:04	17.8	68	1.4	N	0
21/07/2019 00:06:04	17.7	68	0.7	NE	0
21/07/2019 00:11:04	17.6	69	1.4	NE	0
21/07/2019 00:16:04	17.6	69	2.4	W	0
21/07/2019 00:21:04	17.5	70	1.7	NW	0
21/07/2019 00:26:04	17.4	72	2	N	0
21/07/2019 00:31:04	17.4	72	1.4	NE	0
21/07/2019 00:36:04	17.3	72	2.4	NW	0
21/07/2019 00:41:04	17.3	72	1.4	NW	0
21/07/2019 00:46:04	17.2	72	1.4	SE	0
21/07/2019 00:51:04	17.2	72	2.7	NW	0
21/07/2019 00:56:04	17.1	72	1	NE	0
21/07/2019 01:01:04	17	73	1.4	W	0
21/07/2019 01:06:04	17	73	0.7	NE	0
21/07/2019 01:11:04	16.9	73	1	N	0
21/07/2019 01:16:04	16.8	73	0.7	NNW	0
21/07/2019 01:21:04	16.8	74	1	S	0
21/07/2019 01:26:04	16.7	74	0.7	NNW	0
21/07/2019 01:31:04	16.6	74	1.4	NW	0
21/07/2019 01:36:04	16.6	74	1.4	SW	0
21/07/2019 01:41:04	16.5	74	1	N	0
21/07/2019 01:46:04	16.4	74	1.4	S	0
21/07/2019 01:51:04	16.4	74	1.4	S	0
21/07/2019 01:56:04	16.4	74	0.3	N	0
21/07/2019 02:01:04	16.3	74	1	S	0
21/07/2019 02:06:04	16.3	74	1	S	0
21/07/2019 02:11:04	16.3	74	1	S	0
21/07/2019 02:16:04	16.1	74	0.7	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 02:21:04	16.1	75	0.7	E	0
21/07/2019 02:26:04	16	75	0.3	N	0
21/07/2019 02:31:04	16	75	1.4	NNW	0
21/07/2019 02:36:04	16	75	1.4	WNW	0
21/07/2019 02:41:04	16	75	1.4	NNW	0
21/07/2019 02:46:04	16	75	3.7	WNW	0
21/07/2019 02:51:04	15.9	75	2	N	0
21/07/2019 02:56:04	15.9	75	1	N	0
21/07/2019 03:01:04	15.9	75	1.4	N	0
21/07/2019 03:06:04	15.9	75	0.7	SW	0
21/07/2019 03:11:04	15.7	75	0.7	NW	0
21/07/2019 03:16:04	15.7	75	0.3	NW	0
21/07/2019 03:21:04	15.7	75	0.7	W	0
21/07/2019 03:26:04	15.6	76	2	N	0
21/07/2019 03:31:04	15.6	76	0.3	NW	0
21/07/2019 03:36:04	15.5	76	1	S	0
21/07/2019 03:41:04	15.5	77	0.7	W	0
21/07/2019 03:46:04	15.5	77	0.3	W	0
21/07/2019 03:51:04	15.4	77	1.4	SW	0
21/07/2019 03:56:04	15.4	77	0.7	W	0
21/07/2019 04:01:04	15.4	78	1.4	S	0
21/07/2019 04:06:04	15.4	78	1	SW	0
21/07/2019 04:11:04	15.4	78	1	SW	0
21/07/2019 04:16:04	15.2	79	0.7	SE	0
21/07/2019 04:21:04	15.1	79	1	SE	0
21/07/2019 04:26:04	15.1	80	1	S	0
21/07/2019 04:31:04	15.1	80	0.7	SE	0
21/07/2019 04:36:04	15.1	80	0.7	W	0
21/07/2019 04:41:04	15.1	80	0.3	S	0
21/07/2019 04:46:04	15.1	80	1.4	S	0
21/07/2019 04:51:04	15.1	80	0.3	SW	0
21/07/2019 04:56:04	15	80	1	S	0
21/07/2019 05:01:04	14.9	80	0.7	N	0
21/07/2019 05:06:04	14.9	80	0	W	0
21/07/2019 05:11:04	14.9	81	1	SW	0
21/07/2019 05:16:04	14.8	80	0.7	NW	0
21/07/2019 05:21:04	14.8	81	1	N	0
21/07/2019 05:26:04	14.8	81	0.7	S	0
21/07/2019 05:31:04	14.8	81	0.3	SW	0
21/07/2019 05:36:04	14.8	81	0.3	S	0
21/07/2019 05:41:04	14.8	81	1	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 05:46:04	14.8	81	1.7	SSW	0
21/07/2019 05:51:04	14.7	81	1.4	S	0
21/07/2019 05:56:04	14.7	81	1.4	SW	0
21/07/2019 06:01:04	14.9	81	1.4	SE	0
21/07/2019 06:06:04	14.9	81	1.7	S	0
21/07/2019 06:11:04	14.8	81	1	S	0
21/07/2019 06:16:04	14.9	81	1.4	S	0
21/07/2019 06:21:04	14.9	81	0.3	S	0
21/07/2019 06:26:04	15	81	0.7	SW	0
21/07/2019 06:31:04	15.1	81	0.7	S	0
21/07/2019 06:36:04	15.1	80	0.7	S	0
21/07/2019 06:41:04	15.3	80	0.7	SW	0
21/07/2019 06:46:04	15.3	80	0.3	W	0
21/07/2019 06:51:04	15.3	80	0.3	W	0
21/07/2019 06:56:04	15.4	79	0.3	SE	0
21/07/2019 07:01:04	15.4	79	1	SSW	0
21/07/2019 07:06:04	15.4	79	1	S	0
21/07/2019 07:11:04	15.3	79	1.4	S	0
21/07/2019 07:16:04	15.3	79	0.7	S	0
21/07/2019 07:21:04	15.5	79	0.7	NW	0
21/07/2019 07:26:04	15.6	79	1	SW	0
21/07/2019 07:31:04	15.6	78	1.4	SW	0
21/07/2019 07:36:04	15.6	78	1.7	S	0
21/07/2019 07:41:04	15.7	78	1.7	S	0
21/07/2019 07:46:04	15.8	78	1	SW	0
21/07/2019 07:51:04	15.9	77	1	S	0
21/07/2019 07:56:04	16	77	0.7	N	0
21/07/2019 08:01:04	16.1	76	0.7	NE	0
21/07/2019 08:06:04	16.2	76	0.7	SW	0
21/07/2019 08:11:04	16.4	75	1.7	W	0
21/07/2019 08:16:04	16.6	74	1.7	S	0
21/07/2019 08:21:04	16.7	73	1	SE	0
21/07/2019 08:26:04	16.8	73	1	S	0
21/07/2019 08:31:04	17	72	1	W	0
21/07/2019 08:36:04	17.4	72	1.4	WSW	0
21/07/2019 08:41:04	17.8	68	0.7	W	0
21/07/2019 08:46:04	18.1	67	1	S	0
21/07/2019 08:51:04	18.9	65	1	S	0
21/07/2019 08:56:04	19.1	62	1	S	0
21/07/2019 09:01:04	20	61	0.7	NE	0
21/07/2019 09:06:04	20.2	60	1	SW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 09:11:04	20.9	60	0.3	N	0
21/07/2019 09:16:04	21.7	58	0.3	SW	0
21/07/2019 09:21:04	20.9	56	1.7	N	0
21/07/2019 09:26:04	20.6	58	2	S	0
21/07/2019 09:31:04	20.4	60	1.7	SSW	0
21/07/2019 09:36:04	21.4	57	1.4	W	0
21/07/2019 09:41:04	21.8	55	1.7	S	0
21/07/2019 09:46:04	21.3	55	1.4	WSW	0
21/07/2019 09:51:04	21.4	55	1.4	SW	0
21/07/2019 09:56:04	21.5	55	2.4	SW	0
21/07/2019 10:01:04	22.1	54	1.4	SW	0
21/07/2019 10:06:04	22.7	50	1	NW	0
21/07/2019 10:11:04	23.6	48	2	SW	0
21/07/2019 10:16:04	23.3	48	0.7	SW	0
21/07/2019 10:21:04	22.8	48	1.7	SW	0
21/07/2019 10:26:04	22.8	50	1	NW	0
21/07/2019 10:31:04	22.8	51	1.7	S	0
21/07/2019 10:36:04	22.5	51	0.7	S	0
21/07/2019 10:41:04	22.5	50	2	S	0
21/07/2019 10:46:04	22.1	53	3.7	S	0
21/07/2019 10:51:04	22.7	51	2	NW	0
21/07/2019 10:56:04	23.4	50	1	N	0
21/07/2019 11:01:04	22.8	50	3.1	S	0
21/07/2019 11:06:04	22.2	52	5.1	S	0
21/07/2019 11:11:04	21.8	54	2.4	N	0
21/07/2019 11:16:04	21.1	55	4.4	SW	0
21/07/2019 11:21:04	21.5	55	2.4	S	0
21/07/2019 11:26:04	21.5	54	3.1	SW	0
21/07/2019 11:31:04	22.1	54	0.7	SE	0
21/07/2019 11:36:04	22.6	49	3.1	S	0
21/07/2019 11:41:04	23	47	1.7	SE	0
21/07/2019 11:46:04	22.9	47	1.7	NW	0
21/07/2019 11:51:04	22.6	48	1.7	SW	0
21/07/2019 11:56:04	22.3	51	1.7	NW	0
21/07/2019 12:01:04	22.1	52	1.4	SW	0
21/07/2019 12:06:04	22	52	3.1	S	0
21/07/2019 12:11:04	22.2	52	1.4	N	0
21/07/2019 12:16:04	22.2	52	4.1	S	0
21/07/2019 12:21:04	22.1	51	3.4	SW	0
21/07/2019 12:26:04	22.5	48	1.7	NE	0
21/07/2019 12:31:04	22.3	51	3.7	SW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 12:36:04	22.3	51	1.7	NW	0
21/07/2019 12:41:04	22.4	51	3.7	SW	0
21/07/2019 12:46:04	22.3	51	2.4	SW	0
21/07/2019 12:51:04	22.6	47	2.7	NNW	0
21/07/2019 12:56:04	22.9	46	2.4	S	0
21/07/2019 13:01:04	22.7	47	4.8	S	0
21/07/2019 13:06:04	22.4	51	2.4	SW	0
21/07/2019 13:11:04	23	46	1.7	S	0
21/07/2019 13:16:04	23.4	44	2.4	SE	0
21/07/2019 13:21:04	24	42	1	E	0
21/07/2019 13:26:04	24.4	41	1.4	S	0
21/07/2019 13:31:04	24.5	42	1.7	SSW	0
21/07/2019 13:36:04	24.8	41	2.4	SW	0
21/07/2019 13:41:04	24.9	41	1.4	NE	0
21/07/2019 13:46:04	25.3	40	2	N	0
21/07/2019 13:51:04	24.6	41	2.4	SW	0
21/07/2019 13:56:04	24.5	42	4.1	S	0
21/07/2019 14:01:04	24.5	42	4.1	S	0
21/07/2019 14:06:04	24.2	41	3.7	S	0
21/07/2019 14:11:04	23.5	44	2.4	SW	0
21/07/2019 14:16:04	23.6	44	3.4	S	0
21/07/2019 14:21:04	23.9	44	2.4	E	0
21/07/2019 14:26:04	23.6	44	3.7	SSW	0
21/07/2019 14:31:04	24.2	44	1.7	SE	0
21/07/2019 14:36:04	24.6	42	2	S	0
21/07/2019 14:41:04	23.3	44	4.8	SW	0
21/07/2019 14:46:04	23	45	2.7	SE	0
21/07/2019 14:51:04	23.2	46	3.4	SW	0
21/07/2019 14:56:04	23.3	46	3.1	SSW	0
21/07/2019 15:01:04	23.1	48	4.8	S	0
21/07/2019 15:06:04	23.1	49	3.4	NW	0
21/07/2019 15:11:04	22.8	49	4.8	SSW	0
21/07/2019 15:16:04	23.5	48	4.4	SW	0
21/07/2019 15:21:04	23.7	46	1	NW	0
21/07/2019 15:26:04	23.4	46	4.4	S	0
21/07/2019 15:31:04	23.1	48	2.7	SW	0
21/07/2019 15:36:04	23.7	46	2	SW	0
21/07/2019 15:41:04	23.6	46	3.4	NW	0
21/07/2019 15:46:04	23.3	48	1.7	SW	0
21/07/2019 15:51:04	23	49	3.1	S	0
21/07/2019 15:56:04	23.1	50	3.4	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 16:01:04	23.4	50	2	SE	0
21/07/2019 16:06:04	23.8	50	1	S	0
21/07/2019 16:11:04	23.9	49	3.1	WNW	0
21/07/2019 16:16:04	23.7	50	1.7	NE	0
21/07/2019 16:21:04	23.2	49	4.1	SSW	0
21/07/2019 16:26:04	23.5	49	3.7	SW	0
21/07/2019 16:31:04	23.6	50	1.7	E	0
21/07/2019 16:36:04	23.6	50	2.4	NW	0
21/07/2019 16:41:04	23.3	50	1.4	SE	0
21/07/2019 16:46:04	23.2	50	4.1	SW	0
21/07/2019 16:51:04	23.1	50	3.7	S	0
21/07/2019 16:56:04	23.2	50	1.4	NE	0
21/07/2019 17:01:04	23.3	50	3.1	NW	0
21/07/2019 17:06:04	23.5	50	1.4	S	0
21/07/2019 17:11:04	23.4	50	3.1	SSW	0
21/07/2019 17:16:04	23.6	50	1	W	0
21/07/2019 17:21:04	23.7	50	2	NNW	0
21/07/2019 17:26:04	23.3	50	2.4	S	0
21/07/2019 17:31:04	23.1	50	2.4	SE	0
21/07/2019 17:36:04	23	50	2.7	S	0
21/07/2019 17:41:04	23.1	50	1.4	SW	0
21/07/2019 17:46:04	23.1	50	2.4	SSW	0
21/07/2019 17:51:04	23.1	50	3.1	S	0
21/07/2019 17:56:04	23.2	49	1.7	NE	0
21/07/2019 18:01:04	23	50	1.7	SW	0
21/07/2019 18:06:04	23	49	4.1	SW	0
21/07/2019 18:11:04	22.9	48	4.1	WSW	0
21/07/2019 18:16:04	22.9	48	3.1	S	0
21/07/2019 18:21:04	23.1	49	1.7	S	0
21/07/2019 18:26:04	23	48	4.4	S	0
21/07/2019 18:31:04	23.1	48	2.7	SW	0
21/07/2019 18:36:04	23.2	47	5.4	S	0
21/07/2019 18:41:04	22.8	48	4.1	S	0
21/07/2019 18:46:04	22.7	49	4.1	S	0
21/07/2019 18:51:04	22.9	49	3.1	SW	0
21/07/2019 18:56:04	23.1	47	2.4	S	0
21/07/2019 19:01:04	23	48	1.4	S	0
21/07/2019 19:06:04	23	48	2.4	S	0
21/07/2019 19:11:04	22.6	49	3.4	S	0
21/07/2019 19:16:04	22.4	51	2.4	S	0
21/07/2019 19:21:04	22.3	52	4.8	SE	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 19:26:04	22.1	52	2.4	S	0
21/07/2019 19:31:04	21.9	52	3.4	SW	0
21/07/2019 19:36:04	21.8	52	3.7	SW	0
21/07/2019 19:41:04	21.7	53	3.1	E	0
21/07/2019 19:46:04	21.7	53	5.4	SW	0
21/07/2019 19:51:04	21.6	53	4.1	S	0
21/07/2019 19:56:04	21.5	53	4.1	NE	0
21/07/2019 20:01:04	21.5	53	1	S	0
21/07/2019 20:06:04	21.6	53	3.4	SSE	0
21/07/2019 20:11:04	21.4	53	3.7	S	0
21/07/2019 20:16:04	21.1	53	4.1	S	0
21/07/2019 20:21:04	21	53	5.4	SSE	0
21/07/2019 20:26:04	21	53	3.1	SSW	0
21/07/2019 20:31:04	20.9	53	3.4	SW	0
21/07/2019 20:36:04	20.9	53	2.7	S	0
21/07/2019 20:41:04	20.9	54	1.7	S	0
21/07/2019 20:46:04	20.9	54	1.7	SW	0
21/07/2019 20:51:04	20.7	55	1.7	SSE	0
21/07/2019 20:56:04	20.7	55	1.4	SW	0
21/07/2019 21:01:04	20.7	55	2.7	SW	0
21/07/2019 21:06:04	20.5	56	2.4	SW	0
21/07/2019 21:11:04	20.5	57	4.8	S	0
21/07/2019 21:16:04	20.4	58	3.7	S	0
21/07/2019 21:21:04	20.3	58	2	S	0
21/07/2019 21:26:04	20.2	58	3.7	S	0
21/07/2019 21:31:04	20.1	59	2	SW	0
21/07/2019 21:36:04	20	59	3.7	S	0
21/07/2019 21:41:04	20	60	2.4	SSW	0
21/07/2019 21:46:04	19.9	60	3.4	S	0
21/07/2019 21:51:04	19.8	61	3.1	S	0
21/07/2019 21:56:04	19.7	61	2.4	S	0
21/07/2019 22:01:04	19.5	62	2.4	S	0
21/07/2019 22:06:04	19.5	62	4.1	S	0
21/07/2019 22:11:04	19.5	62	4.1	S	0
21/07/2019 22:16:04	19.3	64	3.4	S	0
21/07/2019 22:21:04	19.1	65	4.4	W	0
21/07/2019 22:26:04	19	66	4.4	SW	0
21/07/2019 22:31:04	18.9	67	2.7	SSW	0
21/07/2019 22:36:04	18.9	67	2.4	SW	0
21/07/2019 22:41:04	18.8	68	3.7	SW	0
21/07/2019 22:46:04	18.7	69	2.4	S	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
21/07/2019 22:51:04	18.6	69	2	S	0
21/07/2019 22:56:04	18.5	70	3.1	S	0
21/07/2019 23:01:04	18.3	70	2.7	S	0
21/07/2019 23:06:04	18.3	70	2.7	S	0
21/07/2019 23:11:04	18.1	71	2.4	SW	0
21/07/2019 23:16:04	18	72	3.1	SW	0
21/07/2019 23:21:04	17.9	72	3.7	SW	0
21/07/2019 23:26:04	17.9	73	1.7	SW	0
21/07/2019 23:31:04	17.9	73	2.7	W	0
21/07/2019 23:36:04	17.8	73	2.4	SW	0
21/07/2019 23:41:04	17.8	73	4.1	S	0
21/07/2019 23:46:04	17.8	73	2	S	0
21/07/2019 23:51:04	17.8	73	3.1	S	0
21/07/2019 23:56:04	17.7	73	3.1	S	0
22/07/2019 00:01:04	17.6	74	1.4	SW	0
22/07/2019 00:06:04	17.6	74	2.4	S	0
22/07/2019 00:11:04	17.5	74	4.4	SW	0
22/07/2019 00:16:04	17.4	79	3.7	SW	0
22/07/2019 00:21:04	17.3	79	3.7	S	0
22/07/2019 00:26:04	17.3	80	3.1	SW	0
22/07/2019 00:31:04	17.2	80	2.7	SW	0
22/07/2019 00:36:04	17.2	80	2.7	SSW	0
22/07/2019 00:41:04	17.2	80	2.4	SW	0
22/07/2019 00:46:04	17.2	80	3.1	SW	0
22/07/2019 00:51:04	17.2	80	2	S	0
22/07/2019 00:56:04	17.2	80	3.1	S	0
22/07/2019 01:01:04	17.2	80	2.7	S	0
22/07/2019 01:06:04	17.2	80	3.4	S	0
22/07/2019 01:11:04	17.1	80	3.7	S	0
22/07/2019 01:16:04	17.1	80	1.7	SE	0
22/07/2019 01:21:04	17.1	80	3.4	S	0
22/07/2019 01:26:04	17.1	80	2.7	S	0
22/07/2019 01:31:04	17	81	3.1	W	0
22/07/2019 01:36:04	17	81	2.7	W	0
22/07/2019 01:41:04	17	81	4.4	SSW	0
22/07/2019 01:46:04	16.9	81	2.7	SE	0
22/07/2019 01:51:04	17	81	2.7	SW	0
22/07/2019 01:56:04	17	81	3.1	S	0
22/07/2019 02:01:04	17	81	2	WNW	0
22/07/2019 02:06:04	17	81	2.4	SW	0
22/07/2019 02:11:04	17	81	2.4	SW	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
22/07/2019 02:16:04	17.1	81	3.1	S	0
22/07/2019 02:21:04	17.2	81	1	W	0
22/07/2019 02:26:04	17.2	81	4.4	SW	0
22/07/2019 02:31:04	17.2	81	3.4	S	0
22/07/2019 02:36:04	17.2	81	1.7	S	0
22/07/2019 02:41:04	17.2	81	2	S	0
22/07/2019 02:46:04	17.3	81	2.7	S	0
22/07/2019 02:51:04	17.3	81	1	SW	0
22/07/2019 02:56:04	17.3	81	2.4	S	0
22/07/2019 03:01:04	17.3	81	2.7	SW	0
22/07/2019 03:06:04	17.3	81	2.4	NE	0
22/07/2019 03:11:04	17.4	81	1.4	SW	0
22/07/2019 03:16:04	17.4	81	2.4	S	0
22/07/2019 03:21:04	17.4	81	3.4	S	0
22/07/2019 03:26:04	17.3	81	4.1	S	0
22/07/2019 03:31:04	17.3	81	4.4	S	0
22/07/2019 03:36:04	17.3	81	3.4	SSE	0
22/07/2019 03:41:04	17.3	82	2.7	S	0
22/07/2019 03:46:04	17.3	82	4.1	SW	0
22/07/2019 03:51:04	17.3	82	4.8	S	0
22/07/2019 03:56:04	17.3	82	2.7	SSE	0
22/07/2019 04:01:04	17.4	82	5.1	SW	0
22/07/2019 04:06:04	17.4	82	2.4	S	0
22/07/2019 04:11:04	17.4	82	4.4	S	0
22/07/2019 04:16:04	17.4	82	2.4	SW	0
22/07/2019 04:21:04	17.5	79	1.7	SE	0
22/07/2019 04:26:04	17.4	82	3.1	SW	0
22/07/2019 04:31:04	17.4	82	3.7	S	0
22/07/2019 04:36:04	17.4	82	3.4	S	0
22/07/2019 04:41:04	17.5	79	1.4	S	0
22/07/2019 04:46:04	17.5	79	1	SW	0
22/07/2019 04:51:04	17.5	79	3.1	S	0
22/07/2019 04:56:04	17.5	79	1.4	S	0
22/07/2019 05:01:04	17.6	79	1.7	S	0
22/07/2019 05:06:04	17.6	79	1	SW	0
22/07/2019 05:11:04	17.6	79	1.4	S	0
22/07/2019 05:16:04	17.6	79	1.4	S	0
22/07/2019 05:21:04	17.6	79	3.4	S	0
22/07/2019 05:26:04	17.7	79	2.4	S	0
22/07/2019 05:31:04	17.7	78	3.1	SW	0
22/07/2019 05:36:04	17.8	78	1	N	0

Time	Outdoor Temperature (°C)	Outdoor Humidity (%)	Wind Speed (m/s)	Wind Direction	Hour Rainfall (mm)
22/07/2019 05:41:04	17.9	78	2.4	SW	0
22/07/2019 05:46:04	17.9	78	2	S	0
22/07/2019 05:51:04	17.9	78	3.1	S	0
22/07/2019 05:56:04	17.9	78	2	S	0
22/07/2019 06:01:04	18	77	3.7	SW	0

APPENDIX C

References

Appendix C

References

Documents that have been referenced in this report or are applicable to it include:

1. BS 4142:2014, Methods for rating and assessing industrial and commercial sound.

2. BS 7445-1:2003, Description and measurement of environmental noise. Guide to quantities and procedures.

3. BS 7445-2:1991, Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use.

4. BS 7445-3:1991, Description and measurement of environmental noise. Guide to application to noise limits.

5. World Health Organisation (WHO) Guidelines for Community Noise.

6. BS 8233:2014, Guidance on sound insulation and noise reduction for buildings.

7. Sound Research Laboratories Ltd (1988), Noise Control in Building Services.

8. National Planning Policy Framework (2019).

9. Noise Policy Statement for England (2010).

10. Camden Local Plan (2017)

11. Camden Planning Guidance (2018)

APPENDIX D

Author's Qualifications

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Academic and Professional Qualifications

BSc (Hon)	Audiology - University of Cape Town
MSc	Applied Acoustics - Derby University
MIOA	Institute of Acoustics
MIED	Institute of Engineering Design
MInstSCE	Institute of Sound and Communication Engineers
MIScT	Institute of Science and Technology
PGDip	Post-graduate diploma in Acoustics and Noise Control
	Certificate of competence in Environmental Noise Measurement
	IOSH Certification of Hand-Arm Vibration Risk Assessment and Management
	Cardiff University Law School Bond Solon Expert Witness Certificate

Career Summary

2018 - date **Senior Associate - Hawkins & Associates Limited**

Measurement and analysis of noise-related incidents and disputes, including those related to noise induced hearing loss, planning disputes, noise nuisance and building regulations compliance.

Provision of acoustic design advice for commercial and residential developments, including noise impact assessments.

Assessment of noise exposure under Control of Noise at Work Regulations and implementation of hearing conservation programmes.

Measurement and assessment of Hand-Arm and Whole Body Vibration under Control of Vibration at Work Regulations.

2015 - 2017 **Owner - Forte Acoustics**

Building, Environmental and Occupational Acoustics consultancy on a wide range of projects, including schools, offices, residential and industrial developments.

Delivery of RIBA certified CPD presentations on Noise and Wellbeing in the Workplace.

2014 - 2015 **Acoustics Manager - Frem Group, United Kingdom**

Responsible for all acoustics-related product development and consultancy.

Building acoustics consultancy, predominantly within the commercial sector. Product testing and development including absorbers, screens and pods.

2012 - 2014	**Senior Consultant - Vipac Engineers and Scientists, Australia** Building acoustics consultancy for commercial and residential buildings, including high-rise apartment buildings. Environmental impact assessment. Noise nuisance assessment. Occupational noise exposure and hearing conservation programme assessment. Occupational vibration exposure including hand-arm and whole body vibration.
2011 - 2012	**Senior Consultant, Senior Applications Engineer - Eckel Industries, United Kingdom** Design and commissioning of anechoic chambers, audiometric testing suites and noise control enclosures. Environmental impact studies for planning permission of new mechanical plant. Occupational noise exposure and hearing conservation programme assessment. Assessment of noise nuisance from antisocial behaviour.
2009 - 2011	**Acoustics Manager - Screens at Work, United Kingdom** Responsible for all acoustics-related product development and consultancy. Product testing and development including acoustic absorbers, screens and acoustic pods
2007 - 2009	**Acoustics Consultant - Mackenzie Hoy Engineering Consultants, South Africa** Architectural acoustics consultancy, including design of lecture theatres and a house of legislative assembly. Environmental noise measurement and impact assessment.
2006 - 2007	**Lecturer, Clinical Supervisor - University of Cape Town, South Africa** Lecturer of Hearing Science within the Faculty of Allied Health Sciences, including physics of sound, psychoacoustics and acoustics of speech. Clinical supervisor to third and fourth year Audiology students for clinical practice in Industrial Noise Exposure, Tinnitus Retraining Therapy and Adult Audiological Rehabilitation.