RBS Swiss Cottage,
106 Finchley Road,
London,
NW3 5JN.

Plant noise assessment report

Client: Oswick Ltd

February 2018

Notice

This document and its contents have been prepared and are intended solely for Oswick Ltd information in relation to proposed development at RBS Swiss Cottage, 106 Finchley Road, London, NW3 5JN.

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Executive Summary

CDC has been engaged by Oswick Ltd to undertake a plant noise assessment relating to the proposed development at RBS Swiss Cottage, 106 Finchley Road, London, NW3 5JN.

At the time of writing, no planning conditions relating to the proposed development were known, therefore, a noise limit deemed appropriate has been proposed, relating to the proposed mechanical plant equipment.

A noise survey has been undertaken to establish representative ambient noise levels at the proposed development. These measurements form the basis of the assessment undertaken.

Calculations indicate that acoustic mitigation will not be required provided new and existing plant is at least 6 metres from the nearest identified receptor.

1. Introduction & Overview

1.1. CDC has been commissioned by Oswick Ltd., to undertake an external plant noise assessment, relating to the proposed mechanical services installation, at the rear of RBS Swiss Cottage, 106 Finchley Road, London, NW3 5JN.

1.2. A noise survey was undertaken at the site as part of this assessment. The primary transport noise source in the area is the A41 (Finchley Road) which to the west and south of the site.

1.3. Additionally, a primary school exists close to the south east boundary, adjacent to Trinity Walk. An office block overlooks the site which is to the north west.

1.4. During the survey daytime period, contributory noise factors came from playground noise, traffic associated with the A41 and existing mechanical plant units, located on the roof of the building.

1.5. As part of the proposed works associated with the building, two additional mechanical plant items are to be installed at roof level.

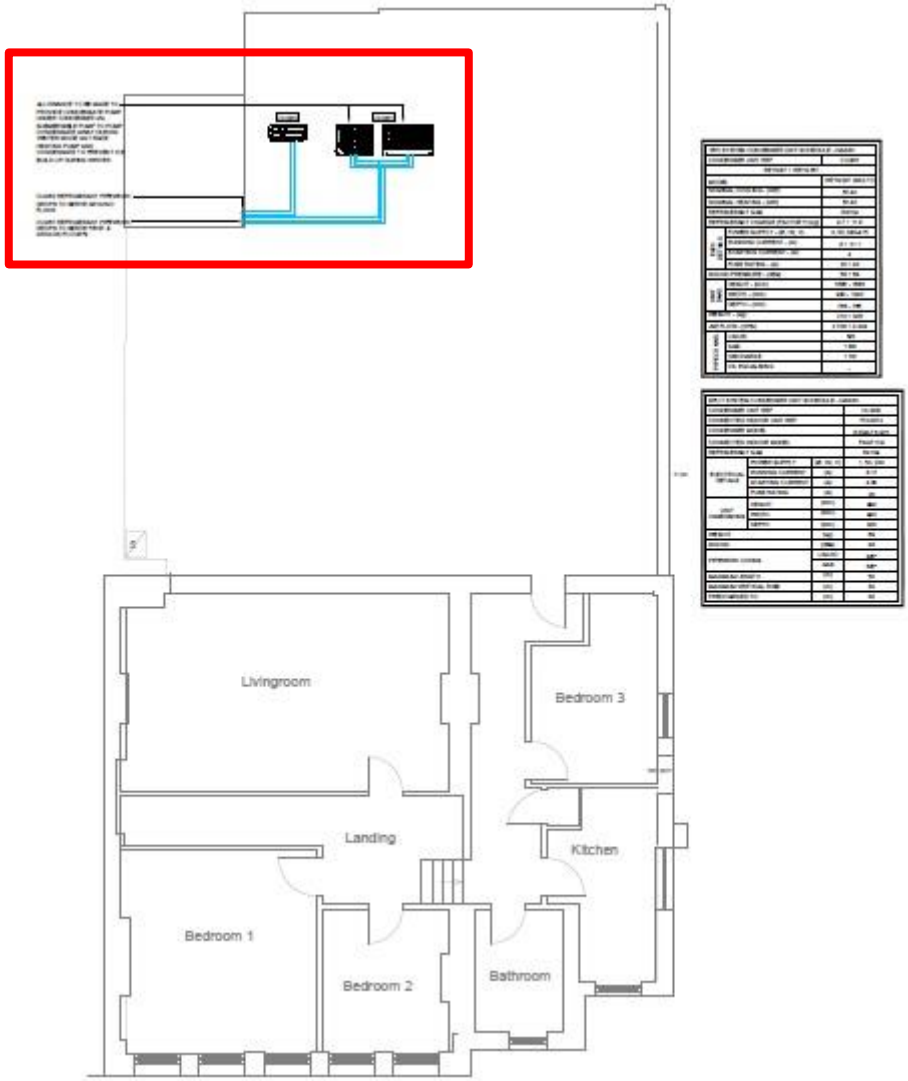
1.6. The following figure outlines the approximate site location (in red).

Figure 1:Site location

1.7. Illustrated in the figure below is the proposed plant location (in red), taken from drawing *'Second Floor Comfort Cooling Services Layout'* Drawing no: 55 02 101, dated November 2017.

1.8. It is understood new proposed plant will operate during normal office hours only, between 09:00 and 16:00 hours.

Figure 2: Proposed plant location



1.9. A summary of survey data has been provided in Appendix A of this report. Full survey measurement data is available upon request.

2. Assessment Methodology

2.1. The following British Standard has been referred to and used as part of the assessment:

- BS4142:2014 “Method for rating and assessing industrial and commercial sound”.

2.2. Although advice is given on the magnitude of impacts, no specific guidance is provided on the significance of the effect of these changes.

2.3. Further detail of the above British Standard is provided below.

BS 4142: 2014 ‘*Method for and assessing industrial and commercial sound’*

2.4. BS 4142:2014 describes methods for determining and assessing noise levels from noise sources with a view to determining the likelihood of adverse impact.

2.5. The document has been developed for the purposes of:

- investigating complaints,
- Assessing sound from proposed new, modified or additional sources of sound of an industrial and / or commercial nature; and
- Assessing sound at proposed new dwellings or premises used for residential purposes.

2.6. The document is now suitable for the determination of noise nuisance. Furthermore, that standard is not intended to apply to the following sources of noise:

- recreational activities, including all forms of motorsport;
- music or other entertainment;
- shooting grounds;
- construction and demolition;
- domestic animals;
- people;
- public address systems for speech;
- other sources falling within the scopes of other standards or guidance.

2.7. The methodology requires the determination of the specific sound level, corrected for characteristic feature in order to produce a rating level. The rating level is then compared against the background noise level (expressed as $L_{A90,T}$), thereby producing an ‘excess of Rating over background sound level’ figure. This figure is then used for assessment of likelihood of adverse impact.

2.8. The standard places great emphasis on the context of the sound environment that is being assessed and the development overall. This is an essential part of the assessment process, particularly when predicting likelihood of adverse impact. However, for guidance the following is included in the standard:

- Typically, the greater the 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 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. When 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. Baseline Data Collection

3.1. Baseline sound measurements were undertaken between Tuesday 23rd and Wednesday 24th January 2018, between the hours of 11:29am and 10:59am, to establish baseline levels for the prevailing acoustic environment.

3.2. The survey period seeks to establish what are typical baseline noise levels at the time when measurements are undertaken.

3.3. The measurement equipment was calibrated before and after measurements were taken and no drift was observed.

3.4. Meteorological conditions during the measurement period were in line with recommendations for environmental noise surveys, with minimal average wind (<5m/s) during the survey. An air temperature of 4-6ºC was noted during the survey. The cloud cover was minimal during all measurement periods. Meteorological conditions did not affect the measurement results.

3.5. Illustrated in the table below are spot measurements undertaken for windspeed and temperature at the beginning and end of the survey.

Table 1: Spot meteorological measurement data

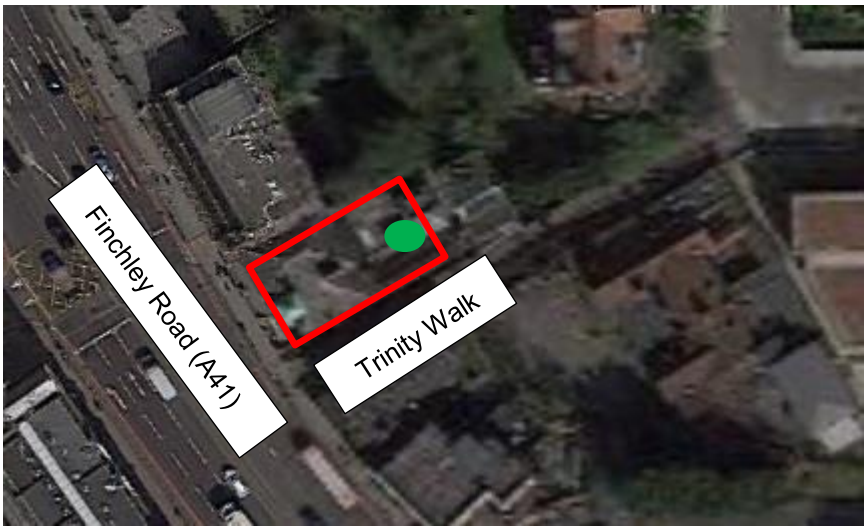
Period	Wind speed (m/s)	Temperature (˚C)
Survey start	3	10
Survey end	1.1	13

3.6. Acoustic measurement equipment used during the survey conforms to relevant British Standards, namely BS EN 61672 and BS EN 60942.

3.7. Measurements were undertaken in accordance with BS7445-1:2003 '*Description and measurement of environmental noise*'.

3.8. External measurements were undertaken over continuous 15minute time periods. The measurement location is shown in the following figure.

Figure 3: Measurement location (in green)



3.9. The measurement location illustrated in the above figure are further detailed below:

Measurement location: External unattended measurements were undertaken at roof level within free field conditions.

3.10. The following table outlines the averaged results of the measurements. The L_{Aeq} values are the logarithmic averages while the L_{A90} values are arithmetically averaged levels. Maximum noise levels have been illustrated as 90th percentile from the measurement data. The data presented represents the measurements between 09:00 to 16:00, the proposed operating hours of the plant.

Table 2: Measured noise levels

Location	Day (09:00-16:00)		
	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB	$L_{Amax,15mins}$ dB
Measurement Location (Figure 3)	64dB	61dB	83dB

4. Assessment

4.1. As part of the development works for the building, the new additional plant is due to be installed at roof level near the measurement location illustrated in Figure 3.

4.2. The plant items to be installed will be a VRV system condenser, model REYQ24T (Multi-unit) which consists of a single REYQ8T and REYQ16T, manufactured by Daikin.

4.3. Additionally, an existing split system condenser unit RZQG71L9V1, manufactured by Daikin, will remain at roof level.

4.4. It is understood the units will operate only during normal office hours (09:00 – 16:00). Shown in the table below is octave band sound pressure data which has been supplied by the manufacturer which has been measured at one metre from the front of the unit while operating at normal duty.

Table 3: Manufacturer octave noise data

Unit	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dB(A)
REYQ8T	60	58	58	57	51	46	48	37	58
REYQ16T	69	67	66	63	57	53	47	43	64
RZQG71L9V1 (Heating mode)	54	52	52	47	44	41	37	32	50
Total SPL_A (at 1 metre)									**65**

4.5. Noise data provided by the manufacturer has been measured in free field conditions.

4.6. Regarding the RZQG71L9V1 unit, noise levels have been taken from when this plant is in heating mode, with cooling mode being 2dB lower. Assessment has, therefore, been undertaken in a ‘worse-case’ scenario.

4.7. The assessment assumes the plant will operate at normal duty consistently throughout normal office hours only.

4.8. Third octave extrapolation of manufacturer plant noise data has revealed potential tonal frequencies within the source noise spectrum. In accordance with section 9.2 of BS4142:2014, this has been judged as ‘just perceptible’ and therefore a 2dB penalty has been applied.

4.9. As previously mentioned, no planning requirements relating to the proposed plant were known at the time of writing. Therefore, a design target of -10dB below average daytime (L_{A90}) background levels has been proposed.

4.10. The nearest defined noise sensitive receiver is illustrated in the following figure.

Figure 4: Nearest noise sensitive receiver (in green)

4.11. The nearest residential receptor comprises of a single storey 3 bedroom dwelling at second floor level to the rear of RBS Swiss Cottage, 106 Finchley Road, London, NW3 5JN. This residence is approximately 6m from the proposed plant location, with the plant also located at second floor level.

4.12. Regarding proposed design target stated above, BS4142:2014 states the following:

- *"The lower the rating 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. When 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."*

4.13. The following table outlines the assessment undertaken for the plant items.

Table 4: Plant noise assessment at nearest receptor

Source level (S_{PL}) at 1 metre	Acoustic Penalty (tonal/ impulsivity)	Distance to receiver (metres)	Day time Background (L_{A90})	Requirement (L_{A90}-10dB)	Resultant	Daytime versus Resultant
65dB(A)	+2dB	6	61dB	51dB	51dB(A)	-10dB

4.14. As can be seen from the table above, plant levels are expected to comply with no requirement for mitigation.

4.15. It should be noted, at the time of writing plant location at roof level was under review. To achieve the calculated level shown above, plant should be no closer than 6 metres from the nearest receptor.

4.16. Additionally, it is assumed plant will be located at flat roof level only and away from corners and additional reflecting surfaces, which may increase source noise levels.

5. Conclusions

5.1. This report outlines the findings of an acoustic assessment undertaken for the proposed development at RBS Swiss Cottage, 106 Finchley Road, London, NW3 5JN.

5.2. A noise survey has been undertaken at the proposed site, as part of this assessment.

5.3. Summary L_{Aeq} survey data is included in appendix A of this report. Full survey data is available upon request.

5.4. At the time of writing, no planning requirements regarding external plant noise were known. It has, therefore, been proposed to use -10dB existing measured daytime background levels (L_{A90}) as measured during the survey undertaken.

5.5. The proposed plant noise design target is in accordance with BS4142:2014, which states:

- *"The lower the rating 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. When 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."*

5.6. The assessment has concluded proposed new and existing plant can be installed at roof level with no requirement for further noise mitigation. This is based upon plant being sited no closer than 6 metres from the nearest receptor as shown in figure 4 and being in operation during the hours of 9am-4pm only.

APPENDIX A – Measurement Results (L_{Aeq} Summary)

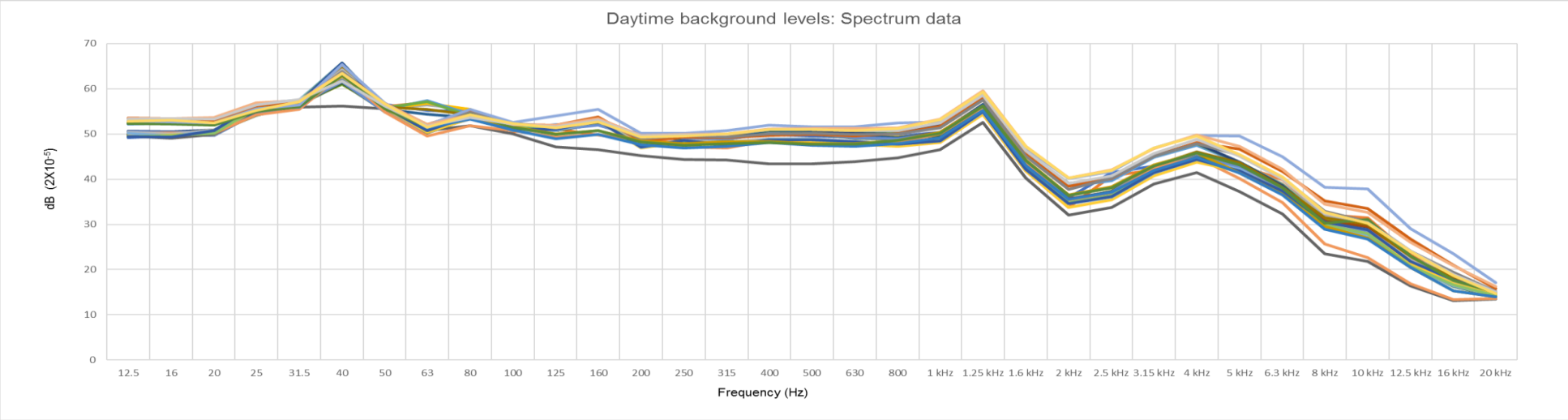
Day

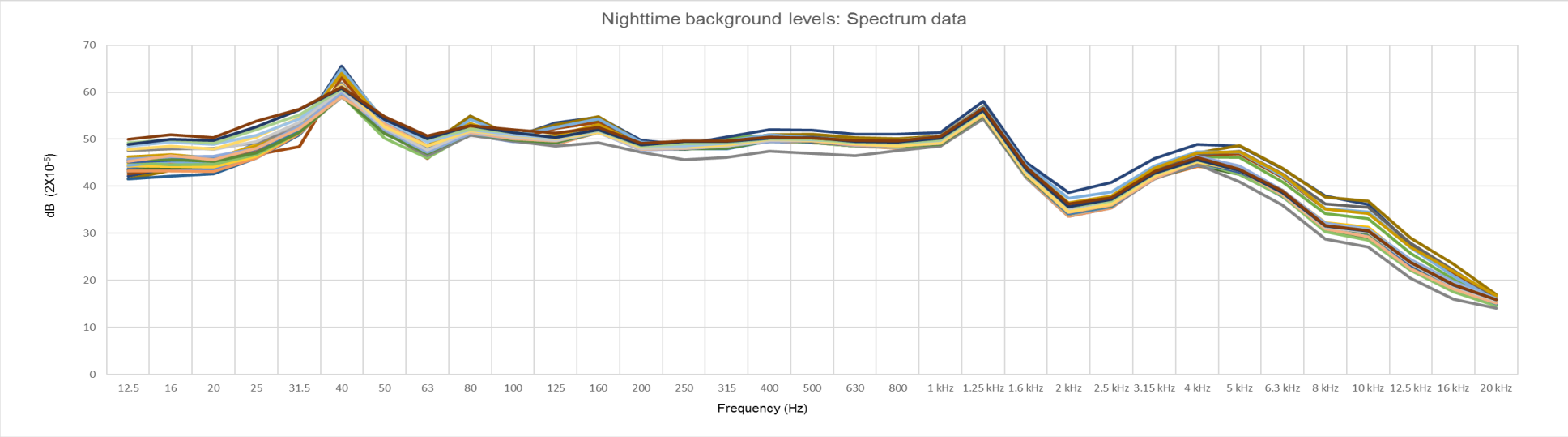
		Main	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz
23/01/2018 11:29	Leq	63.7	58.8	58.3	54.4	55.7	56.3	52.1	51.7	51.8	52.7	52.9	52.4	52.2	52.8	59.4	46.7	39.8	45.6	47.7	52.9
23/01/2018 11:44	Leq	63.1	60.5	58	55.1	55.9	55.8	52	51.6	51.6	52.3	52.4	52	52	52.5	59.2	46.4	39.7	45.2	46.9	50.2
23/01/2018 11:59	Leq	62.3	59.5	58.5	54.5	55.5	56.2	51.6	51.7	51.6	52.2	51.8	51.3	51.3	51.9	58.6	45.7	38.3	40	45.4	48.7
23/01/2018 12:14	Leq	62.1	60.2	58.8	55.3	55	55.8	52.1	52.1	51.7	52.1	51.4	50.9	51	52.4	58.5	45.8	38.5	40.2	45.2	47.8
23/01/2018 12:29	Leq	65.7	60.7	58.3	56.4	55.7	55.7	51.4	51.5	50.8	52.3	52	51.9	52.7	56.6	62.9	49.9	43.1	44.8	48.6	51.4
23/01/2018 12:44	Leq	66.1	60.3	57.8	54.7	55.1	55.6	51.5	51.3	51.1	52.2	51.8	51.7	52.4	56.3	63.4	50.8	43.6	46.4	49.9	51.9
23/01/2018 12:59	Leq	66.4	58.6	58.1	55	54.4	55.9	51.3	51.2	51.1	52.1	51.8	51.8	52.1	55.9	64	51.2	44.4	45.7	49.6	52.3
23/01/2018 13:14	Leq	64.8	56.8	57.6	55.5	54.3	55.9	53.1	51.5	50.7	51.9	51.5	51.1	51.3	54.6	62.1	49.5	42.2	44.3	47.5	50.4
23/01/2018 13:29	Leq	60.2	57.7	56.4	54.2	52.5	53.6	49.7	49.3	49.5	50	49.4	48.8	49	50.4	56.7	44.2	36.3	38.1	43	45.8
23/01/2018 13:44	Leq	63.2	59.9	57.7	55.1	55.3	56.9	51.4	51.5	51.4	52.7	52.8	52.1	51.9	52.6	59.4	46.6	39.3	41.5	47	50.6
23/01/2018 13:59	Leq	63.2	59.6	57.5	55.7	55.2	56.1	51.2	51.4	51.1	52.2	52	51.7	51.3	52.9	59.9	47.2	39.6	41.4	45.9	49
23/01/2018 14:14	Leq	62.1	56.5	57.3	55.4	55.5	55.9	51.6	51.1	50.6	51.9	51.2	50.6	50.5	52	58.8	46.1	38	39.5	44.7	47.8
23/01/2018 14:29	Leq	62.3	56.2	57.3	55.1	54.6	55.6	51.5	51.3	50.6	51.9	51.4	50.8	50.8	52.4	59	46.6	38.9	40.4	45.2	47.9
23/01/2018 14:44	Leq	64.5	55.1	56	54.2	53.7	54.3	50.5	50.2	50	51.2	51.2	51.1	51.4	54.3	61.9	49.2	41.8	44	47	50.2
23/01/2018 14:59	Leq	63.9	56.5	57	55.8	55.6	56.5	51.5	51.8	51.7	52.1	52.1	51.7	51.4	53.1	60.6	47.8	40.7	42.6	47.8	50.5
23/01/2018 15:14	Leq	61	55.6	56.3	53.9	53.2	54.8	49.2	50.2	49.2	49.9	49.8	49.1	49.1	50.3	56.8	44.2	36.7	38.5	47.1	51.3
23/01/2018 15:29	Leq	61.4	55.7	56.9	53.8	53.1	55.1	49.4	50.5	49.4	50.2	50.2	49.8	49.7	51.2	58.2	45.5	38	39.5	43.9	46.9
23/01/2018 15:44	Leq	61.3	56.6	57.1	56.6	56.4	54.8	49.3	50.4	49.2	50	50	49.8	49.6	51.5	58	45.4	37.6	39	44	46.5
23/01/2018 15:59	Leq	62	55.7	56.6	54.3	53.6	54.9	49.8	50.8	49.3	50.1	50.2	50.3	50	52.4	58.9	46	38.5	39.8	44.8	47.1
24/01/2018 08:59	Leq	66.1	59.4	59.9	57.2	56.4	56.6	53	52.7	52.8	54	53	53	54	55.6	62.5	50.8	45.3	46.8	51.3	54.2
24/01/2018 09:14	Leq	65.6	59	59.9	56.9	55.9	57.6	53.6	53.1	53.2	54.4	54.2	53.6	54.3	55.5	61.8	50.1	44.6	46.4	51	53.5
24/01/2018 09:29	Leq	63.7	58.9	58.6	56.6	54.8	55.2	52	51.7	52.3	51.9	51	50.6	51.5	53.5	60.3	49.1	42.8	44.3	48.8	51.2
24/01/2018 09:44	Leq	63.9	59.3	58.3	56.5	54.2	53.9	51.7	50.7	50.6	50.6	50	50	51.2	53.4	60.1	49.1	45.1	46.6	50.8	53.3
24/01/2018 09:59	Leq	64.2	59	58.9	56.8	55.2	55.4	51.8	51.4	51.4	51.5	51.4	51.3	52.3	53.6	60.4	49.1	44.8	46.1	50.4	53
24/01/2018 10:14	Leq	65.3	58.5	59.2	56.2	56.6	57.5	52.6	52.3	52.8	53.9	53.6	53.4	54.1	54.6	61.5	49.5	44.3	45.5	50.2	53.2
24/01/2018 10:29	Leq	67	58.8	58.9	56.5	56	56.8	52.9	52.6	52.5	53.6	53.3	53.1	53.6	56.4	63.9	51.9	47	48.6	52.4	55.1
24/01/2018 10:44	Leq	66	58.3	58.4	56.2	55.5	56.3	52.4	52.3	52.1	52.7	52.6	52.4	53	55.9	62.5	50.9	46.6	47.9	51.9	54.5
24/01/2018 10:59	Leq	67.4	58.7	58.9	56.3	55.5	56.2	52.5	52.3	52.1	52.8	52.8	53	54	58.1	64.3	52.3	47.2	50.2	52.4	54.9

Night

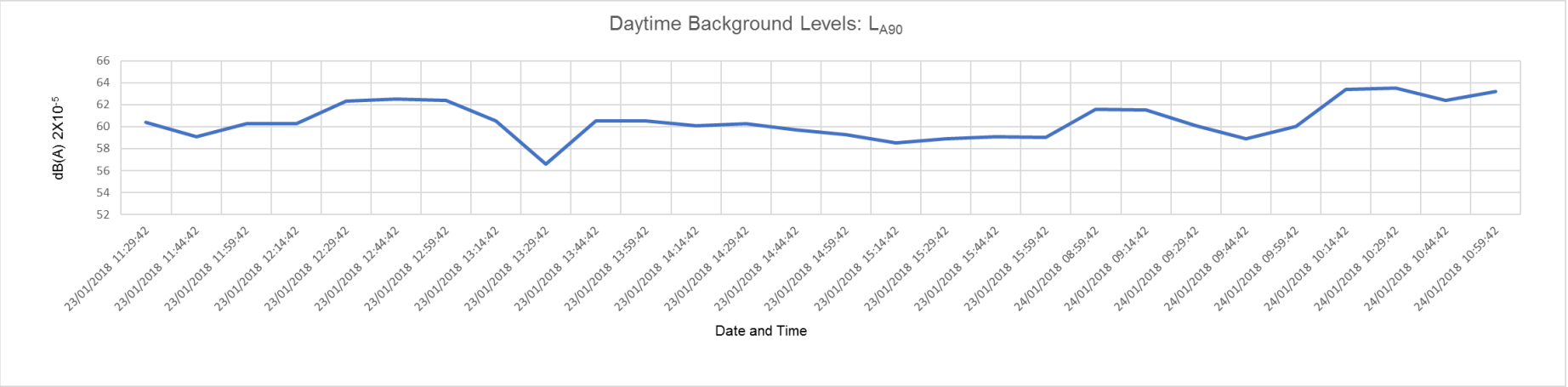
		Main	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz
23/01/2018 23:14	Leq	61.1	53.1	56.7	53.4	54	55	49.8	50	50.9	51.1	50.9	50.1	50.3	51.4	57.6	44.7	36.5	37.8	43.4	45.8
23/01/2018 23:29	Leq	60.6	52.4	56.7	52.9	53.5	54.6	49.7	49.9	50.8	50.9	50.7	49.9	50.1	50.8	56.9	44	35.8	37.2	42.8	45.2
23/01/2018 23:44	Leq	60.7	54.2	56.8	53.6	53.8	55	50.1	50.1	50.9	50.9	50.7	49.9	50	50.8	57	44	36.1	37.4	43.2	45.8
23/01/2018 23:59	Leq	61	52.9	56.8	52.8	53.3	54.7	49.8	49.8	50.7	50.9	50.8	50.2	50.3	51.3	57.3	44.4	36.8	38.6	43.5	45.9
24/01/2018 00:14	Leq	60.9	52.4	57.1	53.3	53.9	54.9	50.2	50.1	50.8	51	50.9	50.1	50.2	51	57.1	44.3	36.5	37.9	43.5	46.1
24/01/2018 00:29	Leq	63.3	51.7	57.9	53.3	55.4	56.2	51.6	50.4	51.7	53.4	53.5	52.1	52.4	52.6	59.5	46.4	40	41.6	46.9	50.3
24/01/2018 00:44	Leq	63.6	51.7	58	53.2	55.5	56.5	51.7	50.5	51.9	53.6	53.4	52.4	52.5	52.8	59.7	46.6	40.1	42	47.4	51
24/01/2018 00:59	Leq	63.1	51.9	57.2	53.4	54.8	56.4	51.5	50.3	51	53	52.8	51.7	51.9	52.3	59.1	46.1	39.8	41.7	46.9	50.6
24/01/2018 01:14	Leq	63.3	52.3	58	53.8	55.2	56.4	51.6	51	51.3	53.3	53.3	52.2	52.2	52.6	59.4	46.5	40.2	41.7	47.1	50.8
24/01/2018 01:29	Leq	63.4	54	58.3	53.6	55.4	56.8	51.4	50.4	51.2	53.3	53.3	52.2	52.2	52.6	59.4	46.4	39.8	41.5	47.1	50.9
24/01/2018 01:44	Leq	62.1	51.9	57	53.2	54.4	56	50.5	49.9	50.6	52.1	51.9	51	51	51.4	58.1	45.3	38.7	40.1	45.7	49.4
24/01/2018 01:59	Leq	60.4	52.3	56.1	53.2	53.5	54.9	50	49.6	50	50.9	50.5	49.7	49.5	50.4	56.7	44	36.8	37.9	43.2	46
24/01/2018 02:14	Leq	60.3	51.7	55.6	52.3	53.4	54.7	49.8	49.8	49.8	50.9	50.4	49.6	49.4	50.2	56.5	43.9	36.8	37.8	43.4	46.1
24/01/2018 02:29	Leq	60.4	52.6	56.4	53	53.5	54.8	50.2	50	49.9	51.1	50.4	49.6	49.4	50.3	56.6	44.1	37.1	38.1	43.7	46.5
24/01/2018 02:44	Leq	60.9	52.7	56.3	53.3	53.6	54.8	50.2	50	49.8	51.2	50.4	49.7	49.6	50.7	57.2	45	39.2	40	45	47.6
24/01/2018 02:59	Leq	62.6	54	57.6	53.9	54.9	55.8	51.8	50.7	51.1	52.8	52.1	51.1	51.3	51.9	58.6	46.3	40.5	41.8	46.8	49.9
24/01/2018 03:14	Leq	63.5	53.4	58.3	53.6	55.2	56.5	51.7	50.7	51.3	53.7	52.9	51.8	52.1	52.5	59.4	46.7	41.5	43.6	48.4	51.9
24/01/2018 03:29	Leq	61.2	52.2	55.8	52.9	53.6	55.1	50.4	49.8	49.7	51.2	50.5	49.7	49.7	50.7	57.1	45	40.5	42.6	47	49.9
24/01/2018 03:44	Leq	61.1	52.7	56.2	53.1	53.8	54.9	50.3	50.1	49.8	51.3	50.6	49.9	49.9	51	57.3	45	38.5	39.3	44.8	47.8
24/01/2018 03:59	Leq	61.8	55.1	57	54	54	55.1	50.7	50.5	50.2	51.3	50.8	50.1	50.1	51.4	57.8	45.9	41	42.2	47.1	49.7
24/01/2018 04:14	Leq	63.5	56.2	57.1	54.5	54.1	54.7	51.2	50.5	50.2	51.2	51	50.4	51	52.4	59.4	48.3	44.9	46	50.3	52.8
24/01/2018 04:29	Leq	63.6	55	58	54	55.1	56.3	51.4	50.8	50.8	52.9	52.7	52.3	52.2	52.9	59.6	47.5	42.5	43.6	48.4	51.7
24/01/2018 04:44	Leq	61	54.1	56.5	53.2	53.5	55.1	49.9	49.9	49.6	51.1	50.7	50	49.9	51	57.3	44.9	37.8	38.8	44.1	47.3
24/01/2018 04:59	Leq	61.3	53.8	56	53	53.7	55.1	50	49.9	49.6	51.2	50.7	50.1	49.9	51	57.3	45.1	39.8	41.6	46.2	49.3
24/01/2018 05:14	Leq	61.5	53.9	56.5	53.3	53.8	54.9	49.9	49.8	50.1	51.1	50.8	50	50.1	51.1	57.4	45	39.7	42.4	46.8	50.2
24/01/2018 05:29	Leq	61.4	53.4	56.5	53.3	53.7	55.2	50	50.1	50.1	51.2	50.8	50.2	50.4	51.5	57.7	45.4	38.7	39.6	44.6	47.9
24/01/2018 05:44	Leq	61.8	54.5	57	54.3	53.9	55.4	50.3	50.2	50.2	51.3	50.9	50.3	50.5	51.9	58.2	46.1	39.6	40.4	45.2	48
24/01/2018 05:59	Leq	62	55	56.8	54	54	55.3	50.6	50.3	50.5	51.5	51.2	50.5	50.7	52.1	58.4	46.3	40.1	41	45.7	48.3
24/01/2018 06:14	Leq	62.3	55.3	56.7	54.3	54	55.3	50.6	50.5	50.6	51.5	51.1	50.7	51.1	52.6	58.8	46.6	40.9	42.7	45.8	48.4
24/01/2018 06:29	Leq	62.5	56.5	56.9	55.4	54.8	55.4	50.8	51.4	51	51.5	51.4	50.8	51.3	52.7	59	46.8	40.3	41.2	45.9	48.6
24/01/2018 06:44	Leq	63.1	57.3	57.6	56.1	54.7	55.8	51.6	53.1	51.6	52.3	53.2	51.6	52.2	53.3	59.5	47.4	40.8	41.8	46.4	49
24/01/2018 06:59	Leq	65.7	57.8	58.3	56.8	55.5	56.2	52.2	52.2	51.8	52.3	51.8	51.3	51.6	53.2	59.6	47.6	42.1	43.6	54.7	60

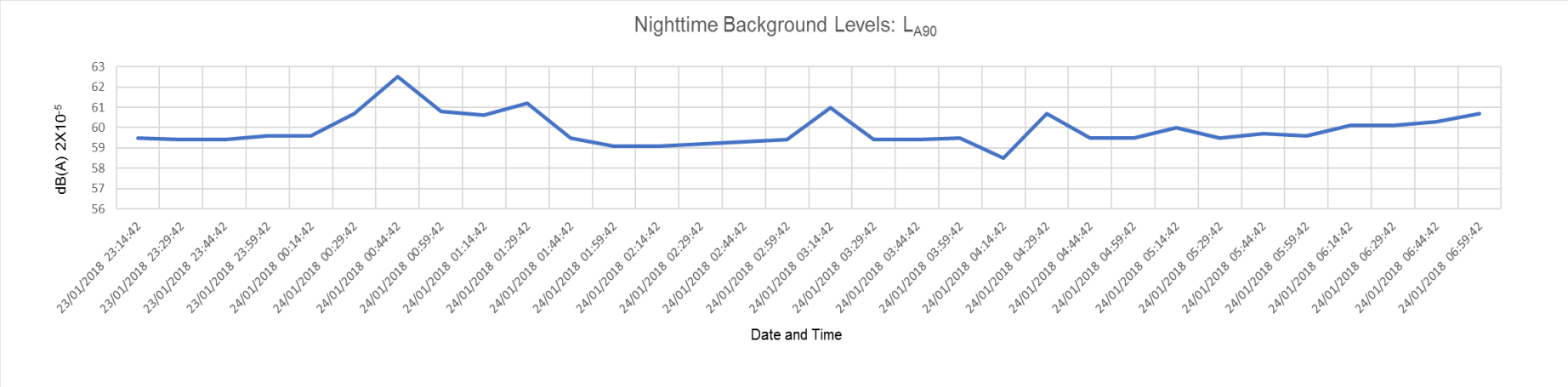
APPENDIX B: Background frequency spectrum data





APPENDIX C: Background L_{A90} data





APPENDIX D – Measurement Equipment

Equipment	Manufacturer	Type	Serial Number
Sound Level Meter	Rion	NL-52	01043459
Preamplifier	Rion	NH-25	43488
Microphone	Rion	UC-59	07235
Calibrator	Rion	NC-74	35246905

All calibration certificates are available upon request