GAIL'S BAKERY, 204 KENTISH TOWN ROAD, LONDON NW5

Plant Noise Assessment

REPORT 8355/PNA
Prepared: 7 November 2018
Revision Number: 1

Gail's Ltd.
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Plant Noise Assessment

GAIL'S BAKERY
204 KENTISH TOWN ROAD
LONDON NW5

REPORT 8355/PNA/Rev1
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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	22 November 2017	David Johnston	Robert Barlow
1	Change to operating hours	7 November 2018	David Johnston	Robert Barlow

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1.0 INTRODUCTION

A new branch of Gail's Bakery is proposed at 204 Kentish Town Road. As part of the planning application it is proposed to install new items of mechanical plant to the rear of the property. The London Borough of Camden requires consideration be given to atmospheric noise emissions from the proposed equipment at the nearest noise-sensitive property.

RBA Acoustics have been commissioned to undertake measurements of the prevailing noise conditions at the site and to determine the atmospheric noise emissions in accordance with London Borough of Camden's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 General

Monitoring of the prevailing background noise at the site was undertaken from Monday 6 to Tuesday 7 November 2017.

During the survey periods the weather conditions were generally appropriate for the noise measurement exercise, it being dry with light winds. There were periods of light rain overnight, however this does not affect the assessment as the plant will not be in operation at this time.

Measurements were made of the L_{A90}, L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes duration.

2.2 Measurement Location

Measurements were undertaken with the microphone positioned on the flat roof at first floor level to the rear of the property (see Site Plan 8355/SP1). This data measured is representative of the noise climate as experienced at the closest residential receptors to the proposed plant to the rear of the property. The prevailing noise climate was noted to be dominated by road traffic noise along Kentish Town Road and the surrounding road network, however the rear of the property was slightly screened from the main road.

2.3 Instrumentation

The following equipment was used for the measurements.

Table 8355/T1 – Equipment Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
Norsonic Type 1 Sound Level Meter	Nor140	1406407	U26539	6 September 2019
Norsonic Pre Amplifier	1209	20688		
Norsonic ½" Microphone	1225	226839	26538	6 September 2019
Norsonic Sound Calibrator	1251	34482	U26537	6 September 2019

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed.

3.0 RESULTS

The noise levels at the measurement positions are shown as time-histories on the attached charts 8355/G1 and G2

In order to ensure a worst case assessment the lowest background L_{A90} noise levels measured have been used in our analyses. The lowest L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 8355/T2:

Table 8355/T2 – Measured Levels

Measurement Period	Measured Noise Level	
	L_{90} (dBA)	L_{eq} (dBA)
Operating Hours (07:00 – 20:00)	52	64

4.0 CRITERIA

The requirements London Borough of Camden's planning requirements for plant noise is confirmed as follows.

> The London Borough of Camden's planning requirements in terms of noise are outlined in the Camden Local Plan (June 2017). For industrial and commercial noise sources the guidance states that a *"Level of 10dB below background (15dB if tonal components are present) should be considered as the design criterion"*.

In line with the above requirements we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following level when assessed at the nearest noise sensitive locations:

- Operating Hours (07:00 – 20:00) 42 dBA

Should the proposed plant be identified as having intermittent or tonal characteristics, a further correction should be subtracted from any of the above proposed noise emission limits.

5.0 ASSESSMENT

Our assessment has been based upon the following information:

5.1 Proposed Plant

1No. Fresh air fan SEL315/2A-1AC
1No. Extract fan SLC450/2-1AC
1No. AC Condensing unit AJ072LELAH
1No. AC Condensing unit AOYG18LBCA
2No. Toilet extract fans K 100 XL

5.2 Position of Units

The condensers are to be located within a basement-level lightwell to the rear of the property. One toilet extract also discharges to this location, and the fresh air intake is also ducted to this location at basement level. The extract ductwork exits the building at ground floor level and is ducted to discharge above roof level. One additional toilet extract is ducted to the very rear of the property, terminating above the flat roof at first floor level. The equipment positions are indicated on the attached Site Plan 8355/SP2.

5.3 Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturers of the units and is reproduced in Table 8355/T3:

Table 8355/T3 – Manufacturer's Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Fresh Air Fan[xx]	Intake L_W	49	49	63	68	70	69	66	57
Extract Fan	Outlet L_W	91	86	89	85	85	84	81	79
AC Unit AOYG18LBCA	L_p at 1m	56	57	51	49	47	40	36	23
AC Unit AJ*072LELAH	L_p at 1m	63	57	48	48	47	44	38	37
Toilet Extract Fan	Outlet L_W	81	80	67	65	62	57	49	38
[xx]Assumed A-weighted noise levels									

Review of the octave band data concludes that there are no tonal characteristics associated with the proposed plant.

5.4 Location of Nearest Residential Windows

The closest residential windows to the plant were advised as belonging to the first and second floor flats of 204 Kentish Town Road overlooking the rear of the property.

5.5 Calculation of Noise Levels at Nearest Residential Window

Our calculation method for predicting noise levels from the proposed plant at the nearest residential window, based on the information stated above, is summarised below.

- Source Term SPL / SWL
- Ducted losses (ducted plant only)
- Distance Attenuation
- Directivity
- Reflections

Calculation sheets are attached for further information in Appendix B.

The results of the calculations indicate a predicted noise level of 57dBA at the first floor window and 56dBA at the second floor window. Noise from the proposed units is therefore above the target criteria and we recommend mitigation is included in the design and installation.

5.6 Mitigation

We recommend that the intake and extract fans be attenuated with in-line attenuators capable of achieving the following minimum insertion losses:

Table 8355/T4 – Attenuator Performance Specification

Fan	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)								Indicative attenuator configuration
	63	125	250	500	1k	2k	4k	8k	
Fresh Air Fan	4	9	17	26	31	30	23	16	1200mm with 40% Free Area
Extract Fan	4	7	13	19	23	23	16	13	900mm with 40% Free Area
Toilet Extract Fan (Basement)	3	5	9	13	15	16	11	9	600mm with 40% Free Area
Toilet Extract Fan (Ground)	1	2	7	10	11	9	8	7	600mm with 50% Free Area

The attenuator for the extract fan should be installed in-line and before the ductwork exits the building to avoid breakout from the ductwork rising up the building.

We also recommend that the walls of the lightwell be lined with an absorbent liner (e.g. WPM Lamaphon) to reduce the reverberant noise build-up. The absorption coefficients assuming 100mm absorption is provided in Table 8355/T5 as an indication:

Table 8355/T5 – Acoustic Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.3	0.6	0.85	0.9	0.9	0.9	0.85	0.85

The resultant calculations indicate a predicted noise level of 41dBA at the second floor window, which is within the criterion required by Camden City Council. The calculations indicate a predicted noise level of 43dBA at the first floor window which is 1dBA over the criterion. This exceedance is discussed below.

6.0 DISCUSSION

The exceedance of the criterion by 1dBA represents a worst-case assessment and would lead to no perceivable change in noise level on a subjective level; a change of 3dBA generally being considered just perceptible. Furthermore, the intention of setting a design level of 10dBA below the prevailing background noise level is generally so that no overall increase to the background noise occurs. In this instance, the cumulative effect of summing the noise level from the plant with the underlying background noise level is an overall noise level of 52dBA, hence no increase to the background noise level has occurred despite a design level of 9dBA below background instead of 10dBA. We would therefore consider the noise levels to be reasonable.

7.0 VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We would typically advise that condensing units, fans and ductwork be isolated from the supporting structure by means of either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not "short-circuited" by associated pipework or conduits. To this end, any conduits should be looped and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

8.0 CONCLUSION

Measurements of the existing background noise levels at 204 Kentish Town Road have been undertaken. The results of the measurements have been used in order to determine the required criteria for atmospheric noise emissions from the future plant installations.

The results of the assessment indicate atmospheric noise emissions from the plant are within the criteria required by London Borough of Camden providing suitable mitigation measures are employed. As such, the proposed plant installations should be considered acceptable.

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10}, L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B – Plant calculations

Received Noise Levels Summary

Unit	Predicted Receive Levels At First Floor Window (dBA)	Predicted Receive Levels At Second Floor Window (dBA)
AC Unit 1	37	34
AC Unit 2	38	34
Intake Fan	25	22
Extract Fan	30	36
Toilet Extract 1	36	32
Toilet Extract 2	32	32
Total Received Level (dBA)	**43***	**41***
*Integer values may be subject to rounding discrepancies of up to 1 dBA		

Example Calculation – Extract Fan to 1st Floor Window

Unit	L_W	Duct Losses (bends, grilles etc)	Attenuator	L_W to L_p	Distance loss	Directivity
Extract Fan	91 dBA	-13 dBA	-18 dBA	-11 dBA	-16 dBA	-3 dBA
					Total	**30 dBA**

Appendix C – CDM Considerations

The following hazards pertinent to our design input have been identified and control measures suggested:

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Vibration Isolators	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3
Inertia bases	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3
Attenuators/ Acoustic Lagging/ Acoustic Screens	Strain of neck, limbs or back.	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4
Attenuators/ Acoustic Lagging/ Acoustic Screens	Skin and respiratory irritation	Contractors	4	3	12	Wear gloves and mask	1	3	3

L: Likelihood
S: Severity
R: Rating

Gail's Bakery, 204 Kentish Town Road

L_{Aeq} Time History

Measurement Position 1, Monday 6 November to Tuesday 7 November 2017

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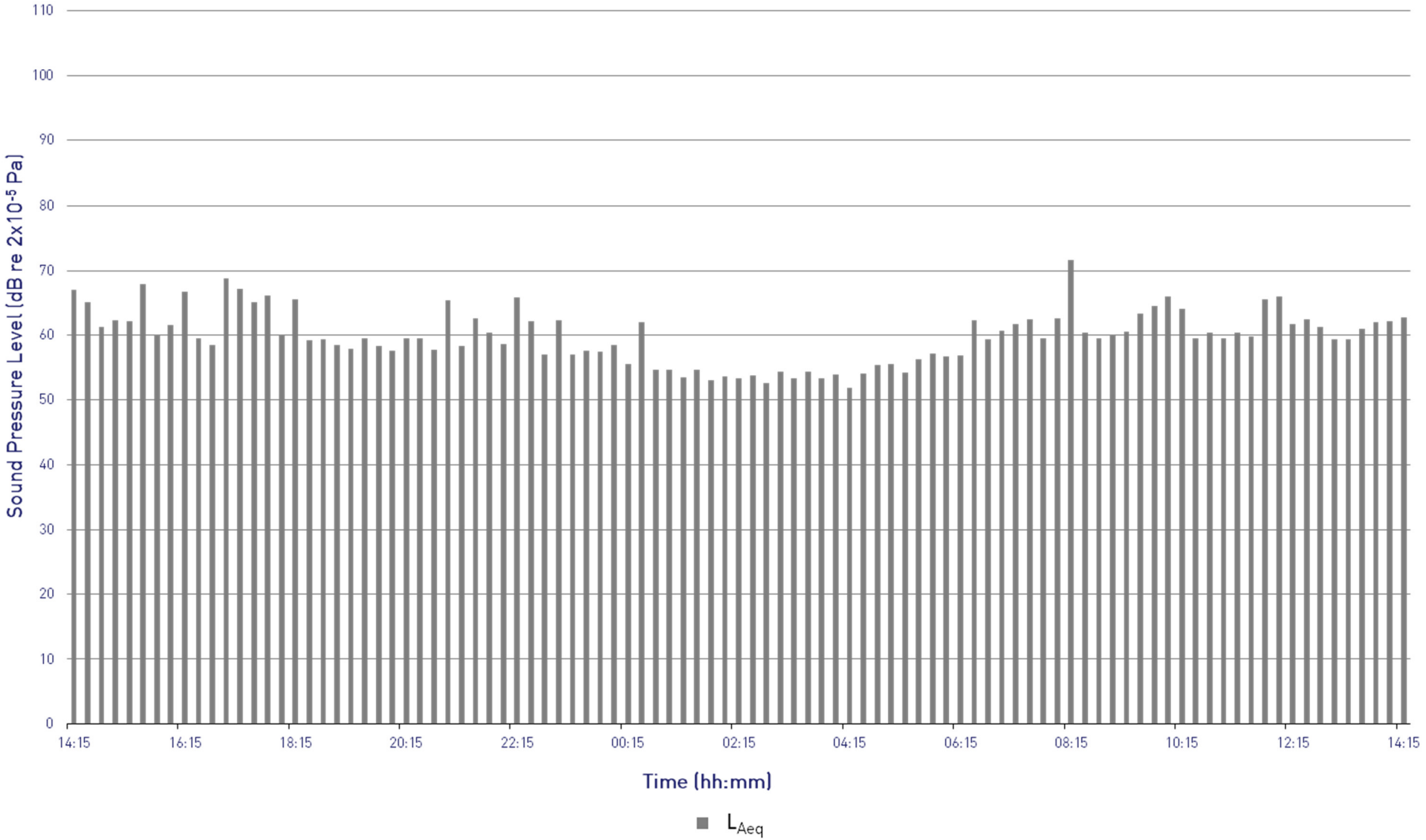
Graph 8355/G1



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$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1, Monday 6 November to Tuesday 7 November 2017

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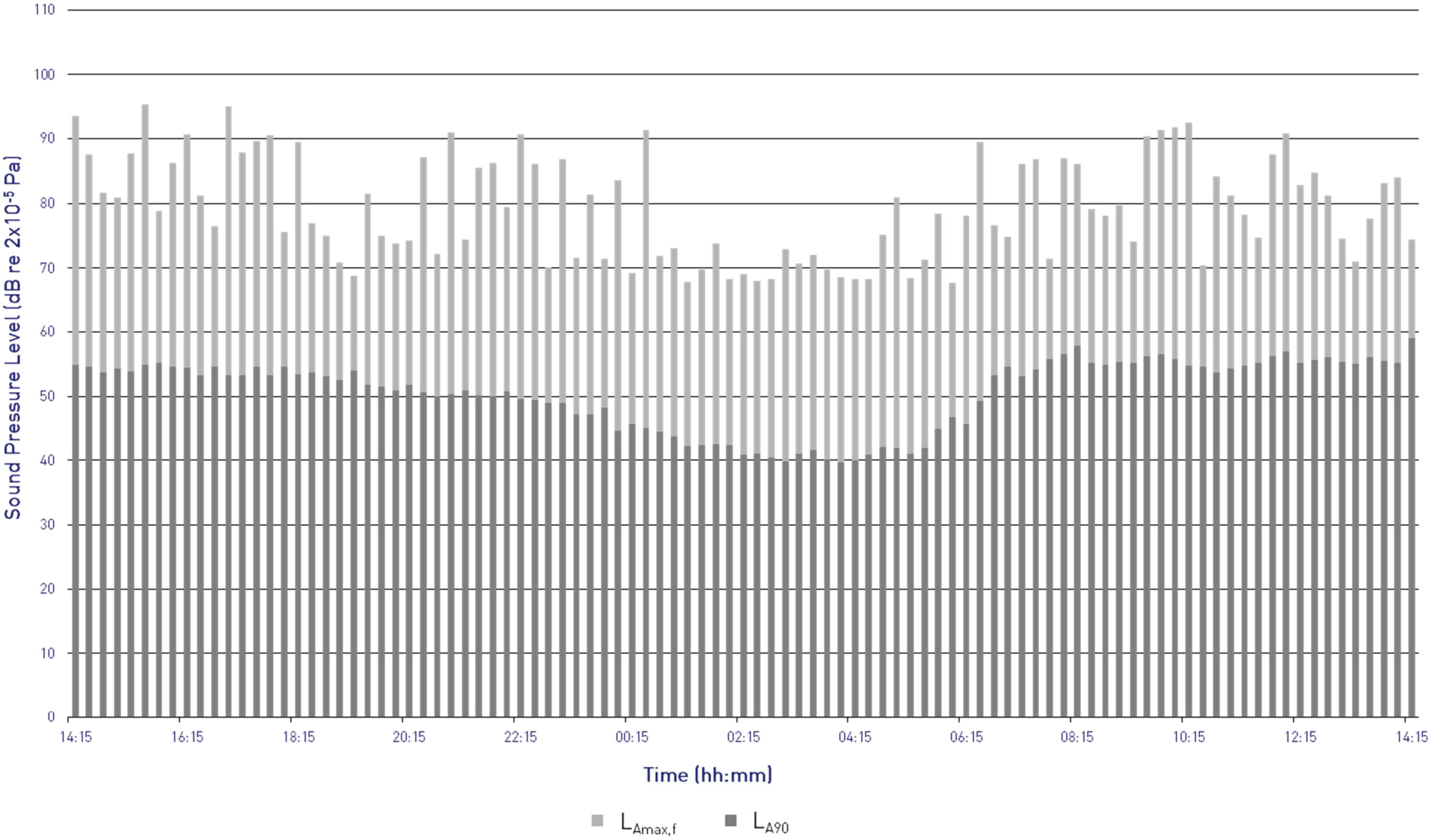
Graph 8355/G2



Gail's Bakery, 204 Kentish Town Road

Site plan showing measurement and assessment positions

Site Plan 8355/SP1

7 November 2018

Not to Scale

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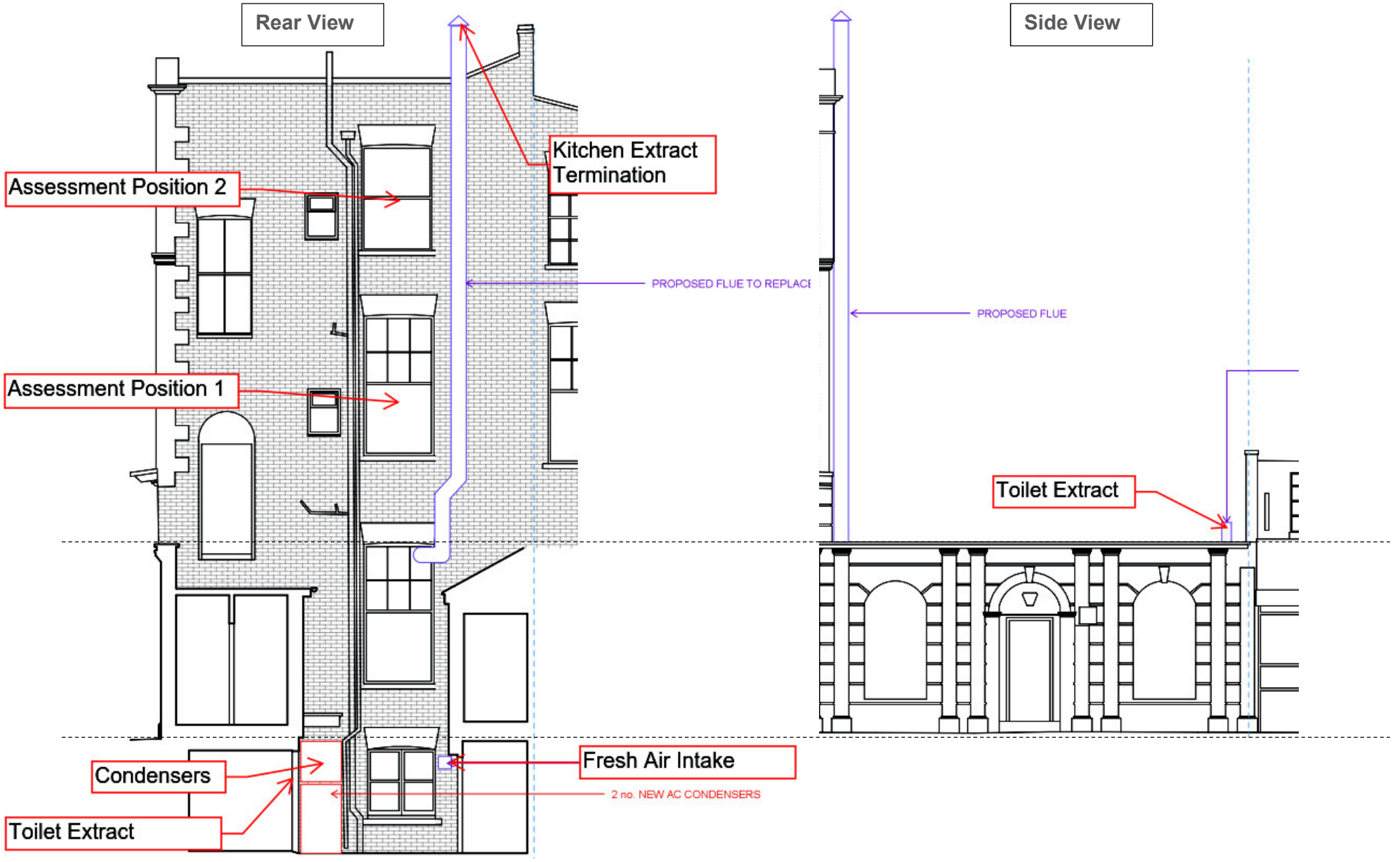

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Elevations showing plant locations

8355/SP2 & SP3

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Not to Scale

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Gail's Bakery, 204 Kentish Town Road

Photo showing measurement position

Figure 8355/P1

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Not to Scale

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