

Papa John's, High Street, Ruislip

# Plant Noise Assessment

Report 19/0580/R1

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Report 19/0580/R1

WYG

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## Plant Noise Assessment

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### Attachments

#### Glossary of Acoustic Terms

##### **19/0580/SP1**

Site plan illustrating the measurement and assessment positions on site

##### **19/0580/TH1**

Unattended noise survey time history

##### **19/0580/SCH1**

Schedule of attended noise measurements

##### **19/0580/CS1-CS6**

Calculation sheet receiver summaries

 End of Section



## Plant Noise Assessment

### 1 Introduction

- 1.1 Planning permission has been granted for the change of use from an amusement arcade centre (sui Generis) to a hot food takeaway (Class A5) at 70 High Street Ruislip. The permission is subject to conditions. One of the conditions requires an assessment of the external noise levels emitted from the plant items to be undertaken.
- 1.2 Cole Jarman have been instructed to undertake a noise survey at the site to quantify the existing background noise levels representative of those at the nearest residential receivers. A plant noise assessment has been undertaken to determine the impact of the mechanical services plant and to advise on any mitigation that is needed to reduce the impact on local residents.
- 1.3 This report documents the methodology used to conduct the noise survey and the calculation of noise emissions from the proposed plant to noise sensitive locations.

### 2 Site Description

- 2.1 The site is located at 70 High Street, Ruislip. The unit is in use as a Papa John's pizza outlet and operates until 23h00 Monday to Sunday. The upper floor, and most exposed position to the plant noise, is in residential use.
- 2.2 The site is located on High Street, a busy commercial road through Ruislip comprising several fast food restaurants. The neighbouring units comprise further mixed use takeaway/retail units and residential.
- 2.3 To the rear of the unit, is a residential car park, used solely by the surrounding residents beyond which is further residential.

### 3 Plant Noise Limits

- 3.1 As part of the planning permission (application ref 3862/APP/2018/3104) The Council of the London Borough of Hillingdon provided the following condition (condition 5) pertaining to noise:

*"Prior to first occupation of the development, details shall be submitted to the council of the external noise level emitted from plant/machinery/ equipment and mitigation measures as appropriate. The measures shall ensure that the external noise level emitted from plant, machinery/ equipment will be lower than the lowest existing background noise level by at least 5dBA, by 10dBA where the source is tonal, as assessed according to BS4142:2014 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity."*



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- 3.2 It is therefore considered that the plant noise limits be set at 5 dB below the existing background noise level in line with BS4142:2014, or 10 dB below if tonal.

## 4 Noise Survey

### 4.1 Methodology and Instrumentation

- 4.1.1 An attended and unattended noise survey was undertaken to quantify noise levels incident at the residence above the unit overlooking the proposed plant position.
- 4.1.2 To the rear of the unit, non-attended measurements were made of the existing plant levels and the background noise levels, over the period 23h00 -12h30 on 15<sup>th</sup>-16<sup>th</sup> November 2019. The meter was set up to the rear of the building at a free field position approximately 2m from ground floor level. This measurement position is shown as MP1 in attached site plan 19/0580/SP1.
- 4.1.3 Measurements of the noise levels were made in the form of  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A90}$ , and  $L_{A10}$  over consecutive 15 minute periods (see attached Glossary of Acoustic Terms for an explanation of noise units used)
- 4.1.4 Attended measurements of the existing plant noise levels were made at three positions, which are adjacent to AP1, AP2 and AP3 respectively, indicated on attached figure 19/0580/SP1 and described below:
- AMP1 – First floor window overlooking the extract fan position
  - AMP2 – First floor window above the flat roof at the end of the alley
  - AMP3 – First floor window to the rear of the unit
- 4.1.5 These plant noise measurements were made over no more than 1 minute intervals as noise levels were constant.
- 4.1.6 Noise measurements were made using the equipment detailed in the table below:

Item	Manufacturer	Type
Sound Level Analyser	Norsonic	140
Acoustic Calibrator	Norsonic	1251
Weatherproof windshield	Norsonic	1212

T1 Equipment used during attended noise survey.

- 4.1.7 The sound level analysers were fitted with windshields and were calibrated before and after the measurements to ensure that acceptable levels of accuracy were maintained throughout the survey period.



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4.1.8 The weather conditions during the survey were cold and overcast, with no discernible breeze.

### 4.2 Results

4.2.1 Attended measurements taken of the plant are presented in the attached schedule 19/0580/SCH1 whilst the unattended background noise measurement are presented in attached time history 19/0580/TH1.

4.2.2 The noise climate was controlled by intermittent road traffic on the High Street, which includes a bus route in both directions.

4.2.3 The minimum background noise levels taken during the unattended background noise survey are set out in the table below:

Location	Minimum $L_{A90,T}$ (dB)	
	Operational Hours (11h00-23h00)	Night-time (24 Hours)
MP1	40	32

T2 Minimum background noise  $L_{A90}$  measured during unattended noise survey

## 5 Plant Noise Limits

5.1 Based on the survey results and the local authority requirements, the following plant noise limits are to apply:

Location	Plant Noise Emission Limits, dB(A)	
	Operational Hours (11h00-23h00)	Night-time (24 Hours)
Noise sensitive receptors	35	27

T3 Plant noise emission limits at the nearest residential properties

5.1.1 The noise limits are to apply at 1m from the outside of nearby residential windows. Any plant with a tonal component would be subject to a further penalty in line with BS4142:2014 and the requirement of the local authority.



## Plant Noise Assessment

### 6 Plant Noise Assessment

#### 6.1 The Installation

- 6.1.1 The store operates using a Cold Room Condenser, Fresh Air Intake and an Extract Fan. The equipment has already been installed.
- 6.1.2 The cold room unit is located externally to the rear of the unit on the south facing façade at high level. The supply intake fan is mounted internally and ducted, terminating at high level in the ground floor rear western façade within the alley. The extract fan is located internally and is ducted out of the same façade as the supply, however the duct (including in-line silencers) runs along and up, terminating at high level 1 metre above the eaves.
- 6.1.3 All plant items run during the store opening hours, 11h00-23h00 daily, with only the cold store condenser running 24 hours a day.
- 6.1.4 Measurements were taken of these plant items individually and collectively at each of the assessment positions to determine the existing noise levels at these receivers.

#### 6.2 Methodology

- 6.2.1 Our assessment is based on measured noise data from site as shown in the attached schedule 19/0580/SCH1. The noise data suggests that no tonality correction need be applied.
- 6.2.2 The assessment has considered the closest and most exposed receptors to the proposed plant, labelled on attached site plan 19/0580/SP1 and described as follows:
- AP1 – First floor window overlooking the extract fan position
  - AP2 – First floor window above the flat roof at the end of the alley
  - AP3 – First floor window to the rear of the unit

#### 6.3 Results

- 6.3.1 The results of our assessment indicate that mitigation of noise emissions from each plant item will be required.
- 6.3.2 An enclosure will be required for the cold store unit meeting the insertion losses detailed in table T4 below. In addition to this, the unit is required to be relocated to a minimum of 1m further away from the noise sensitive receptor.
- 6.3.3 Both fans (supply and extract) require silencers. The supply currently does not have any silencer, and the proposal is for an entirely new one. The extract fan already has 2 circular 'straight through' silencers and one square 'straight through' silencer. The specification below is for a single new rectangular 'splitter' silencer which is proposed to replace the existing ones (which would be removed).



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- 6.3.4 The minimum insertion loss requirement for these new silencers can be found in table T4 below.

	Octave Band Centred Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Cold Room Enclosure	12	13	20	29	36	37	39	39
Supply Silencer	10	20	35	48	50	50	50	37
Extract Silencer	9	18	31	48	50	49	44	24

T4 Required insertion losses

- 6.3.5 Silencers should be located as close to the fan as possible. With silencers located externally, any sections of ductwork between the building façade and silencers should be acoustically lagged with 10kg/m<sup>2</sup> *mufti-lag* (or equivalent), in order to reduce noise breakout from the duct. It has been advised that the kitchen extract fan for this site does not need to be Melinex-faced and the specification is for a standard splitter silencer.
- 6.3.6 The insertion losses required for the supply fan intake duct is expected to be achieved with a silencer of 2100mm length and 30% free area, while the extract silencer will need to be 2100mm length and 35% free area, although these are quoted as guidance only. The enclosure specification is expected to be met by *Environ* products (other manufacturers may also be suitable).
- 6.3.7 If not already included as part of the installation, a flexible connection should be used between the fans and first sections of rigid ductwork to ensure vibration is not transmitted into the building structure via the ductwork.
- 6.3.8 Silencers should be sized appropriately to avoid regenerative noise and excessive pressure drops.
- 6.3.9 The rating noise levels calculated with the mitigation measures specified above installed on site are shown in table T5 below. With these measures in place, the plant noise limits are met at all locations.



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Location	Rating Noise Level, dB(A) <i>(Limit)</i>	
	Daytime (11h00-23h00 only)	Night-time (24-hours)
AP1 – First floor window overlooking the extract fan position	33 (35)	25 (27)
AP2 - First floor window above the flat roof at the end of the alley	33 (35)	26 (27)
AP3 - First floor window to the rear of the unit	27 (35)	27 (27)

T5 Plant noise rating levels at residential receiver locations

6.3.10 Summary results can be seen in attached receiver summaries 19/0580/CS1-CS6. Full calculation sheets are available on request.

## 7 Conclusion

- 7.1 Planning permission has been granted for the change of use from an amusement arcade centre (sui Generis) to a hot food takeaway (Class A5) at 70 High Street Ruislip. A planning condition requires that an assessment of the external noise levels emitted from the plant items be undertaken.
- 7.2 Details of the attended and unattended noise survey completed at site have been set out within this report, quantifying existing background noise levels.
- 7.3 An environmental noise assessment has been made assessing the impact of the proposed plant as installed on site. Mitigation measures are proposed to all existing plant items.
- 7.4 With all the proposed new mitigation measures in place, the proposed plant will meet the noise limits set by the planning condition.

■ End of Section



## Plant Noise Assessment

# Glossary of Acoustic Terms

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### $L_{Aeq}$ :

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A)  $L_{eq}$ .

### $L_{Amax}$ :

The maximum A-weighted sound pressure level recorded over the period stated.  $L_{Amax}$  is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the  $L_{Aeq}$  noise level. Unless described otherwise,  $L_{Amax}$  is measured using the “fast” sound level meter response.

### $L_{A10}$ & $L_{A90}$ :

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The  $L_{An}$  indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified.  $L_{A10}$  is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly  $L_{A90}$  gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

$L_{A10}$  is commonly used to describe traffic noise. Values of dB  $L_{An}$  are sometimes written using the alternative expression dB(A)  $L_n$ .

### $L_{AX}$ , $L_{AE}$ or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event.  $L_{AX}$  values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of  $L_{Aeq}$  for the total noise. The  $L_{AX}$  term can sometimes be referred to as Exposure Level ( $L_{AE}$ ) or Single Event Level (SEL).

■ End of Section

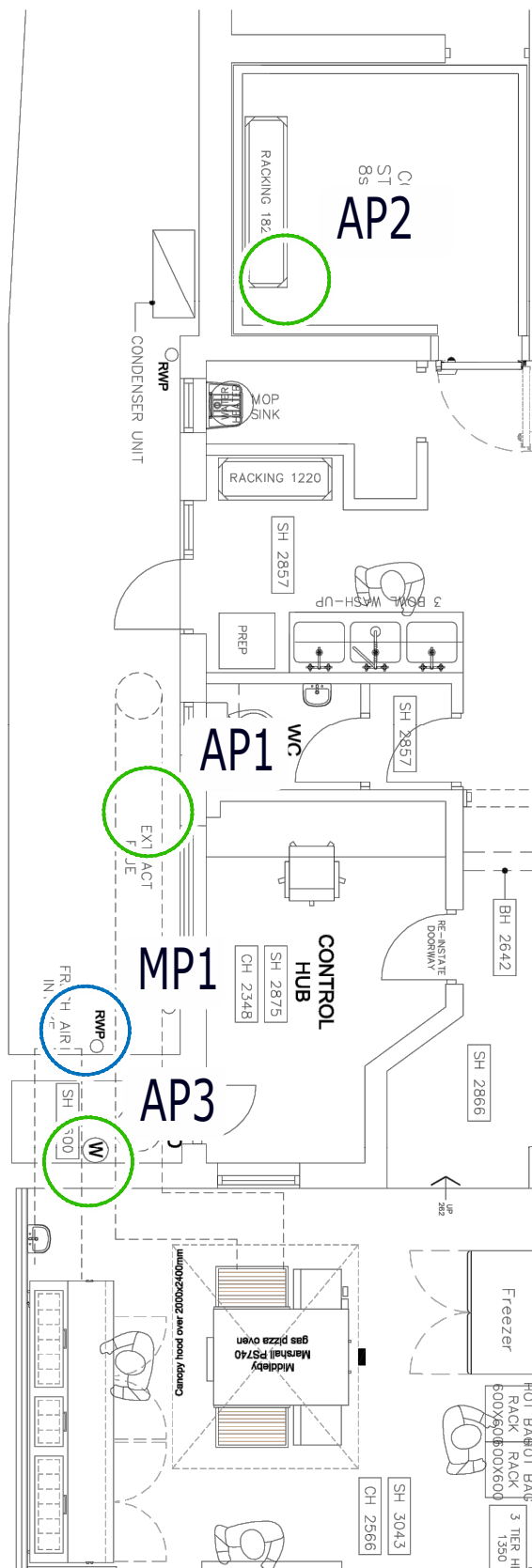


Figure 19/0580/SP1

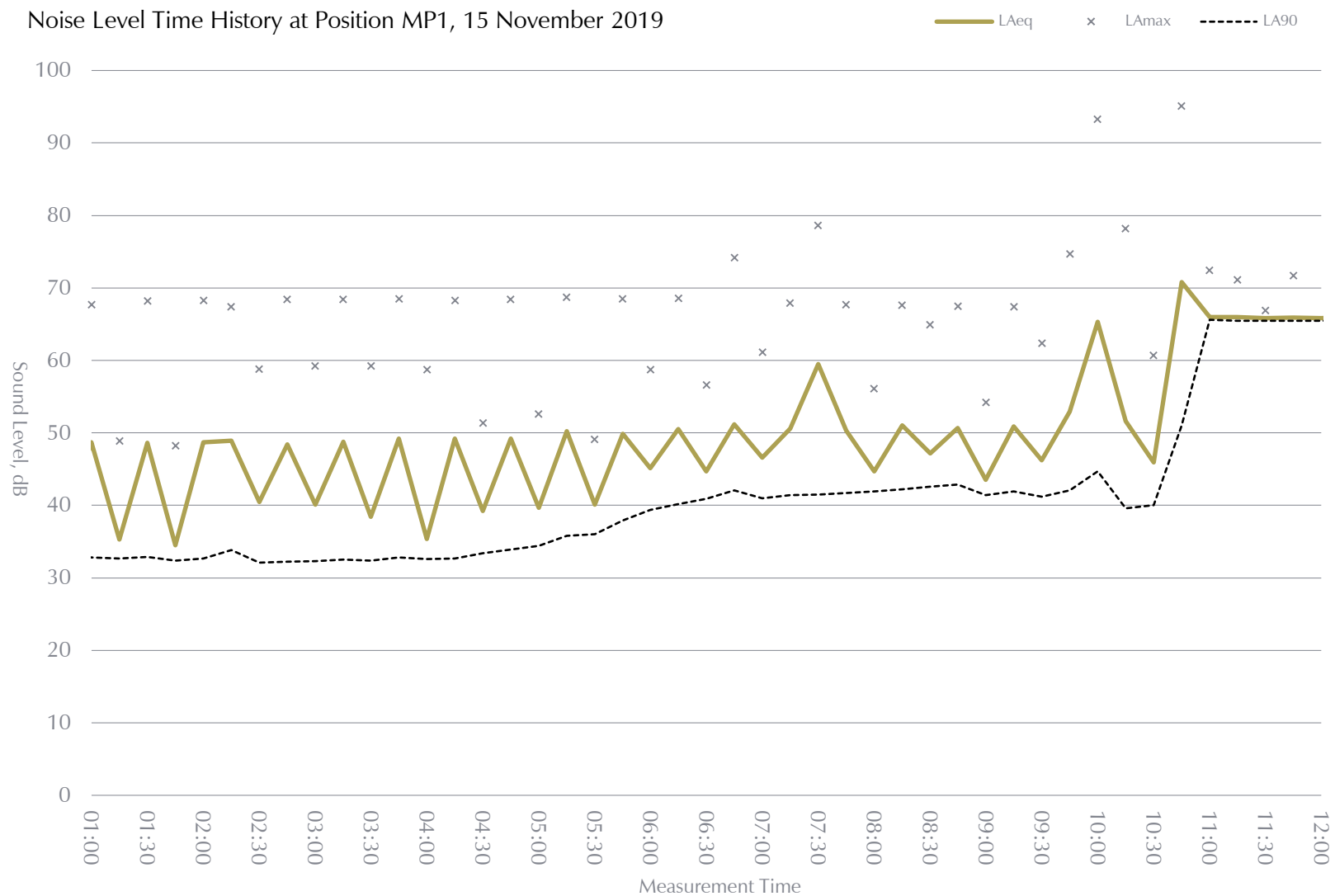
Revision: -

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Figure 19/0580/TH01



Papa John's High Street, Ruislip



## Noise Survey Results

## Measurement Position 1

Description	Date & Time	Duration (mm:ss)	$L_{Aeq}$	$L_{Amax}$	$L_{A90}$
Condenser <i>1m from AP1</i>	14/11/2019 23:08	01:00	50	62	48
Extract <i>1m from AP1</i>	14/11/2019 23:18	01:00	51	53	50
Extract <i>1m from AP2</i>	14/11/2019 23:22	01:00	48	50	48
Extract <i>1m from AP3</i>	14/11/2019 23:38	01:00	41	45	39
Intake <i>1m from AP1</i>	14/11/2019 23:42	01:00	61	63	60
Intake <i>1m from AP2</i>	14/11/2019 23:45	01:00	57	58	57
Intake <i>1m from AP3</i>	14/11/2019 23:48	01:00	47	57	46
Condenser start up <i>1m from unit</i>	14/11/2019 23:52	00:11	68	71	62
Condenser <i>1m from AP2</i>	14/11/2019 23:53	01:00	47	53	47
Condenser <i>1m from AP3</i>	14/11/2019 23:56	00:43	48	57	47
Intake <i>1m from unit</i>	15/11/2019 00:00	01:00	66	68	66
Background noise <i>All units off</i>	15/11/2019 00:06	01:00	37	48	34
All units on <i>1m from AP1</i>	15/11/2019 00:10	01:00	49	55	49
All units on <i>1m from AP2</i>	15/11/2019 00:11	01:00	61	63	60
All units on <i>1m from AP3</i>	15/11/2019 00:13	01:00	58	59	57



**Project Name** Papa John's, High Street, Ruislip

**Project Reference** 19/0580

**Receiver Reference** AP1 Day

**Description** First floor window overlooking the extract fan position

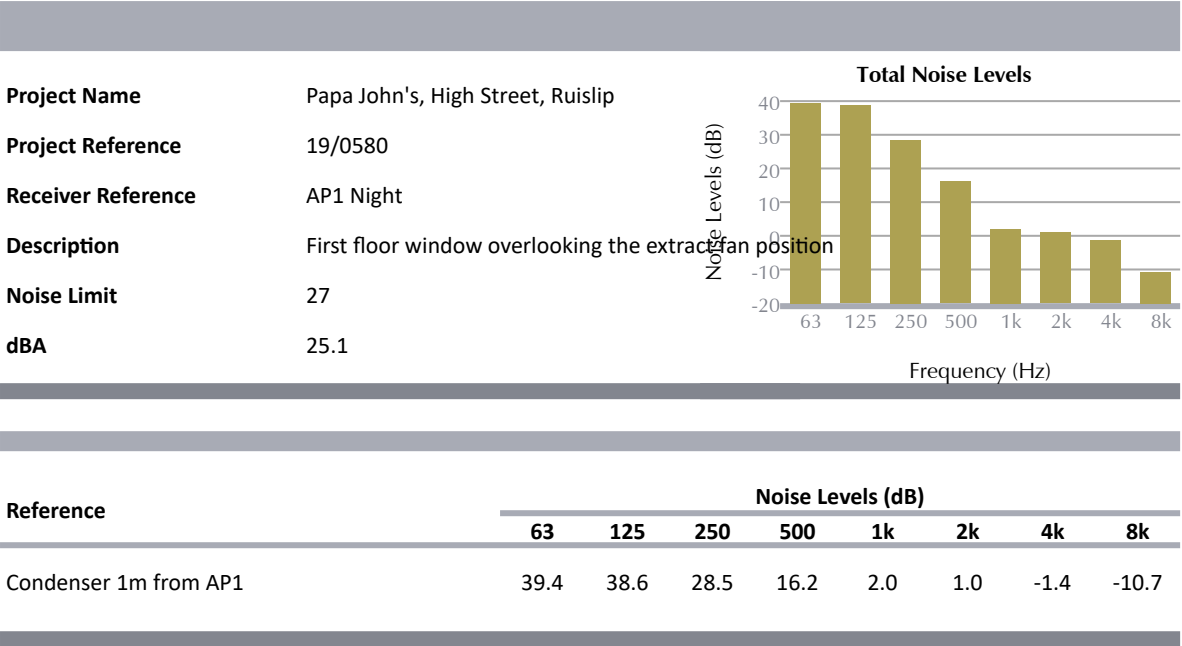
**Noise Limit** 35

**dBA** 32.5

**Total Noise Levels**

Frequency (Hz)	Noise Levels (dB)
63	50
125	48
250	32
500	22
1k	5
2k	4
4k	1
8k	4

Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Extract Inlet 1m from AP1	45.8	37.4	14.8	-6.6	-10.9	-11.5	-11.8	1.4
Intake 1m from AP1	48.4	46.0	26.8	10.5	1.3	-0.5	-5.2	-0.2
Condenser 1m from AP1	39.4	38.6	28.5	16.2	2.0	1.0	-1.4	-10.7





**Project Name** Papa John's, High Street, Ruislip

**Project Reference** 19/0580

**Receiver Reference** AP2 Day

**Description** First floor window above the flat roof at the end of the alley

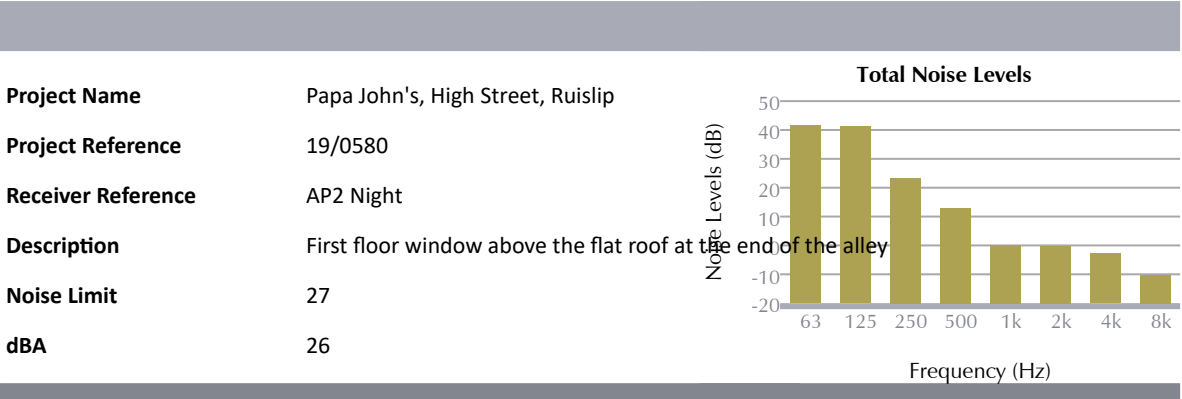
**Noise Limit** 35

**dBA** 33.2

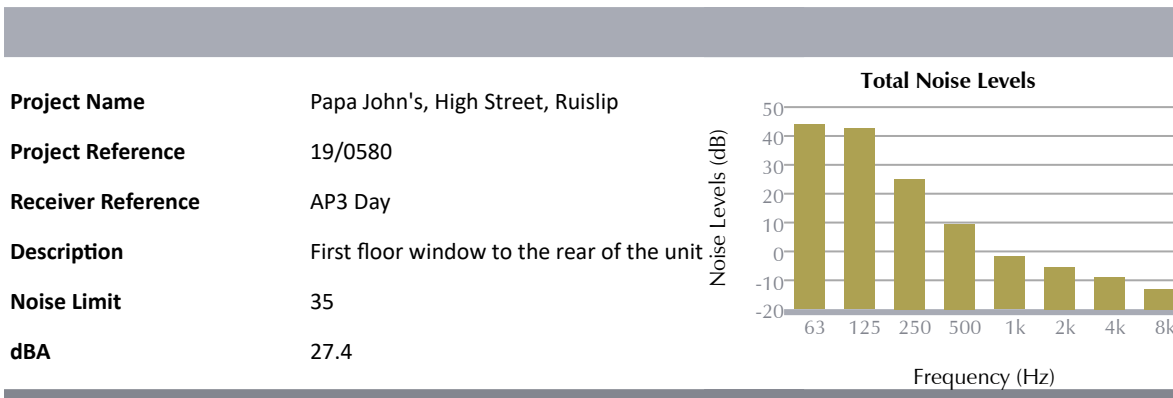
**Total Noise Levels**

Frequency (Hz)	Noise Levels (dB)
63	50.3
125	36.0
250	8.7
500	-8.9
1k	-12.4
2k	-15.4
4k	-16.4
8k	-3.1

Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Extract inlet 1m from AP2	50.3	36.0	8.7	-8.9	-12.4	-15.4	-16.4	-3.1
Intake 1m from AP2	54.1	44.7	17.8	7.6	0.6	-6.3	-10.8	-7.2
Condenser 1m from AP2	41.5	41.2	23.4	13.0	0.1	-0.2	-2.7	-10.2



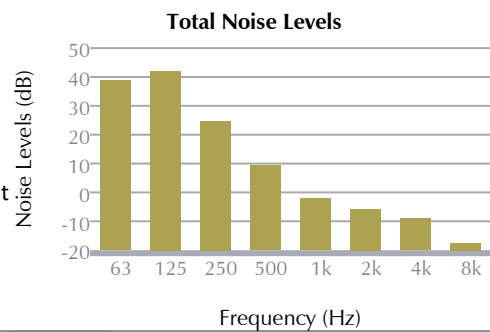
Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Condenser 1m from AP2	41.5	41.2	23.4	13.0	0.1	-0.2	-2.7	-10.2



Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Extract inlet 1m from AP3	39.2	26.6	5.4	-18.4	-22.9	-27.6	-29.5	-16.4
Intake 1m from fan	39.8	30.9	12.3	-6.0	-14.4	-17.5	-23.1	-20.4
Condenser 1m from AP3	38.7	42.1	24.8	9.4	-2.0	-5.7	-9.1	-17.5



**Project Name** Papa John's, High Street, Ruislip  
**Project Reference** 19/0580  
**Receiver Reference** AP3 Night  
**Description** First floor window to the rear of the unit  
**Noise Limit** 27  
**dBA** 26.7



Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Condenser 1m from AP3	38.7	42.1	24.8	9.4	-2.0	-5.7	-9.1	-17.5



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