

Rosa's Thai

Jackson's Corner
Reading
RG1 3AS

Plant Noise Impact Assessment

On behalf of



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For and on behalf of Noise Solutions Ltd				

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1	3 rd Feb 2022	Updated plant layout	NAC	JS

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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by StuArt Consultancy to undertake a noise impact assessment for new plant serving the proposed Rosa's Thai restaurant at Jackson's Corner, Reading.
- 1.2. Cumulative plant noise emission levels for the proposed plant have been predicted at the most affected noise sensitive receptors and assessed against the requirements of the relevant planning condition.
- 1.3. To assist with the understanding of this report a glossary of acoustic terms can be found in **Appendix A**. An in-depth glossary of acoustic terms can be viewed online at www.acoustic-glossary.co.uk.

2.0 Details of development proposals

- 2.1. The proposed Rosa's Thai restaurant will occupy part of the basement and ground floor of the redeveloped building at Jackson's Corner, Reading. The remainder of the ground floor and basement are commercial units, while there are new residential properties on the floors above and in another wing of the building at the rear.
- 2.2. Plant is to be located within the restaurant and in the courtyard at the rear.
- 2.3. Internal plant will comprise a WC extract fan (F/3) and a bar extract fan (F/4), which will discharge through cowls into the rear courtyard. A supply fan (F/1), kitchen extract fan (F/2) and two air conditioning condensers (CU/1 and CU/2) will be located within the courtyard, below a walkway serving first floor flats. The kitchen extract discharge duct will run vertically to roof level.
- 2.4. All plant will operate only when the restaurant is trading.
- 2.5. **Appendix B** contains a table with the manufacturer's published sound pressure levels for the proposed plant.

4.0 Nearest noise sensitive receptors

- 4.1. The area surrounding the site is a mix of commercial and residential properties.
- 4.2. The nearest residential properties are within the development site. To provide a robust assessment, noise levels have been predicted to five residential windows overlooking the rear courtyard, as follows:
- R1 – First floor, directly above F/1, CU/1 and CU/2, but screened from them by the walkway serving the first floor flats;
 - R2 – First floor, directly above F/2 and the exhaust terminations of F/3 and F/4 and with the kitchen exhaust duct running vertically alongside;
 - R3 – Second floor on the wing opposite the plant, with a direct view of the extract plant and ducts, but screened from F/1, CU/1 and CU/2 by the walkway;
 - R4 – Third floor, alongside the kitchen exhaust duct and below the duct discharge point;
 - R5 – Fifth floor of the wing opposite the plant, with a view of the kitchen exhaust termination.
- 4.3. An aerial view showing the site and surrounding area, and images showing the locations of the plant and the receptors described, are presented in [Appendix C](#).

5.0 Plant noise criterion

Reading Borough Council

- 5.1. Permission was granted for the Jackson's Corner development in 2018. Condition 17 of the Decision Notice 171238 states:

No mechanical plant shall be installed until a noise assessment of the proposed mechanical plant has been submitted and approved by this Council. The assessment shall be carried out in accordance with BS4142:2014 methodology. The predicted rating level, $L_{A,T,r}$, specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to sensitive facades shall be no greater than 30dBA when all plant/equipment (or any part of it) is in operation. The plant shall thereafter only be installed in accordance with the assessment. Reason: To safeguard the amenities of the adjoining premises and the area generally, in accordance with Policy CS34 of the Reading Borough LDF Core Strategy 2008 (Altered 2015) and Policy DM4 of the Reading Borough LDF Sites and Detailed Policies Document 2012 (Altered 2015).

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

- 5.2. BS 4142:2014 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014 includes "sound from fixed plant installations which comprise mechanical and electrical plant and equipment".
- 5.3. The procedure contained in BS 4142:2014 is to quantify the "*specific sound level*", which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15 minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.
- 5.4. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.
- 5.5. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: "Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible."
- 5.6. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "Subjectively, this can be converted to a penalty of 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."
- 5.7. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:
- *Typically, the greater this difference, the greater the magnitude of the impact.*
 - *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
 - *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;*
 - *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

- 5.8. The standard does state that "adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."
- 5.9. The standard goes on to note that: "Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."
- 5.10. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:
- "An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."
- 5.11. BS 4142:2014 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

6.0 Plant noise impact assessment

- 6.1. The cumulative plant noise levels at the nearest noise sensitive receptors have been predicted. The assessment has considered attenuation, directivity, any screening between source and receivers and distance attenuation. The predictions are based on all plant operating at normal duty.
- 6.2. Predictions are inclusive of the attenuation specified in [Appendix D](#).
- 6.3. The proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. To be robust, however, a +3dB feature correction as advised in BS 4142:2014 has been applied for the possible presence of *"...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment..."*.
- 6.4. Table 1 summarises the results of the assessment at the most affected properties. All other nearby receptors benefit from increased distance/screening to the plant such that resulting noise levels will be lower than at the receptors considered. The full set of calculations can be found in [Appendix E](#).

Table 1 Assessment of predicted noise levels at the nearest noise sensitive receptors

Receptor	Period	Predicted rating level at receptor, $L_{A,r,Tr}$ (dB)	Design criterion (dB $L_{A,r,Tr}$)	Difference (dB)
R1	Restaurant trading hours	30	30	0
R2	Restaurant trading hours	30	30	0
R3	Restaurant trading hours	29	30	-1
R4	Restaurant trading hours	30	30	0
R5	Restaurant trading hours	30	30	0

- 6.5. The noise level predictions demonstrate that cumulative noise emissions from the proposed plant will comply with the proposed limits at the nearest residential windows.

Context and uncertainties

- 6.6. Where possible uncertainty in the above assessments has been minimised by taking the following steps:
- The meter and calibrator used have a traceable laboratory calibration and the meter was field calibrated before and after the measurements.
 - Uncertainty in the calculated impacts has been reduced by the use of a well-established calculation method.
- 6.7. As BS 4142:2014 advises, the impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:
- The assessment is undertaken at the nearest residential windows. The impact on all other nearby windows will be lower due to screening and distance attenuation.
 - It should be noted that the above assessment is based on all plant operating at maximum duty. Given that the plant will not operate at maximum design duty all of the time the above assessment is considered to be representative of the worst case.

Vibration isolation

- 6.8. To control plant vibration into the building structure it is recommended that all plant is installed on suitable anti-vibration mounts.

7.0 Summary

- 7.1. Noise Solutions Ltd (NSL) has been commissioned by undertake a noise impact assessment for new plant serving the proposed Rosa's Thai restaurant at Jackson's Corner, Reading.
- 7.2. The cumulative plant noise emission levels for the proposed have been predicted at the most affect noise sensitive receptor locations and, when attenuated as specified in this report, are determined to be in compliance with the relevant planning condition. Therefore, the plant proposals should not be a reason for refusal of planning permission.

Appendix A Acoustic terminology

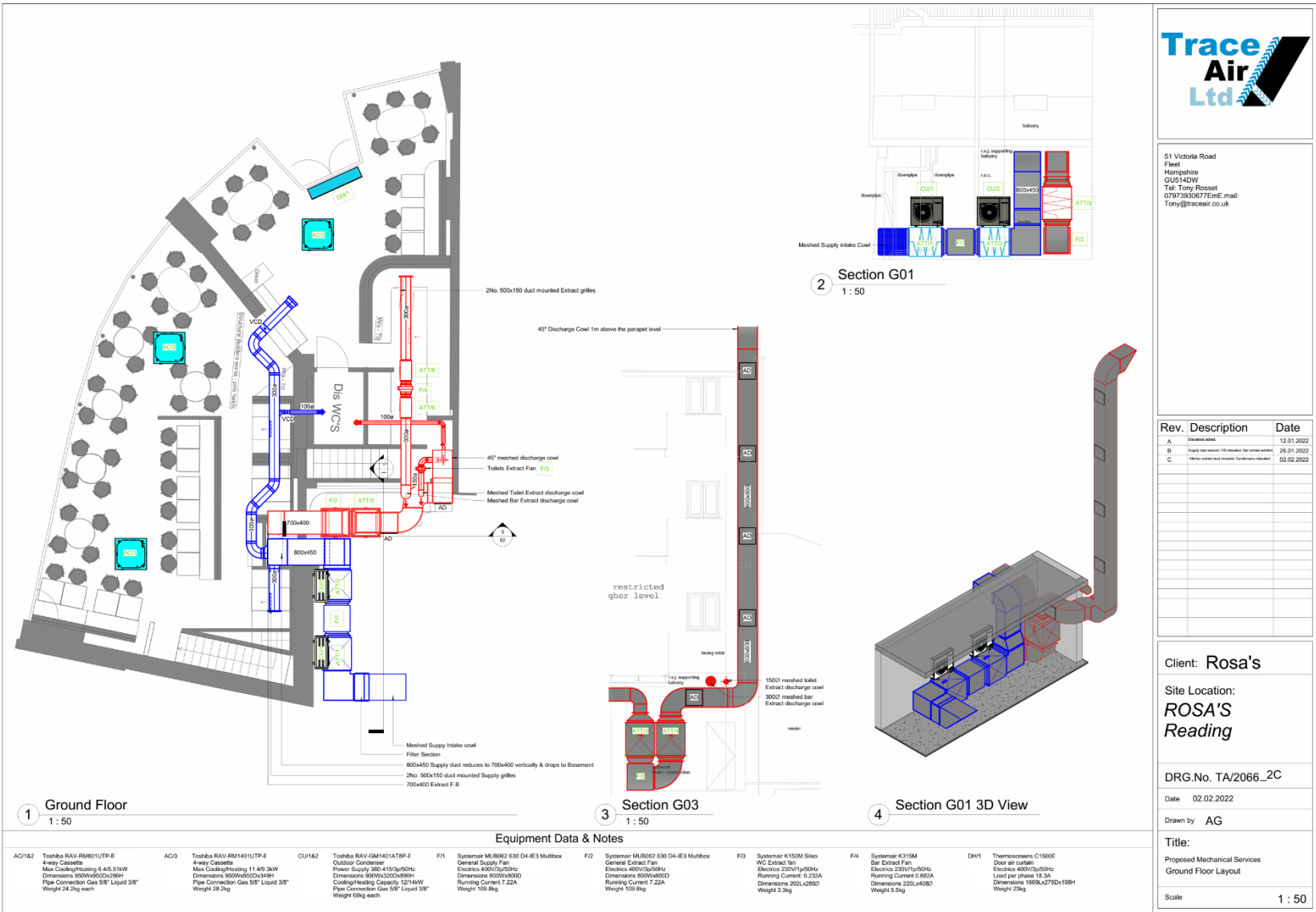
Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example

Appendix B Plant information and manufacturer published sound data

Plant Reference	Unit/Model	No. of units	Description	Sound power level (dB) at octave band centre frequencies (Hz)								dBA (dB)
				63	125	250	500	1k	2k	4k	8k	
Supply Fan (F/1)	Systemair MUB062 630 D4-IE3 Multibox	1	Intake L _w	86	93	90	87	85	81	77	72	
			Casing L _w	66	77	62	55	55	52	44	36	
General Extract Fan (F/2)	Systemair MUB062 630 D4-IE3 Multibox	1	Discharge L _w	85	95	91	89	87	82	80	74	
			Casing L _w	64	78	62	55	55	53	46	37	
WC Extract Fan (F/3)	Systemair K 150 M Sileo	1	Discharge L _w	75	68	53	57	52	49	47	31	
Bar extract fan (F/4)	Systemair K315M	1	Discharge L _w	76	77	75	68	67	67	66	62	
Air Conditioning Condensers (CU/1, CU/2)	Toshiba RAV-GM1401AT8P-E	2	Sound pressure level at 1m (each)									57

Appendix C Images showing areas of interest

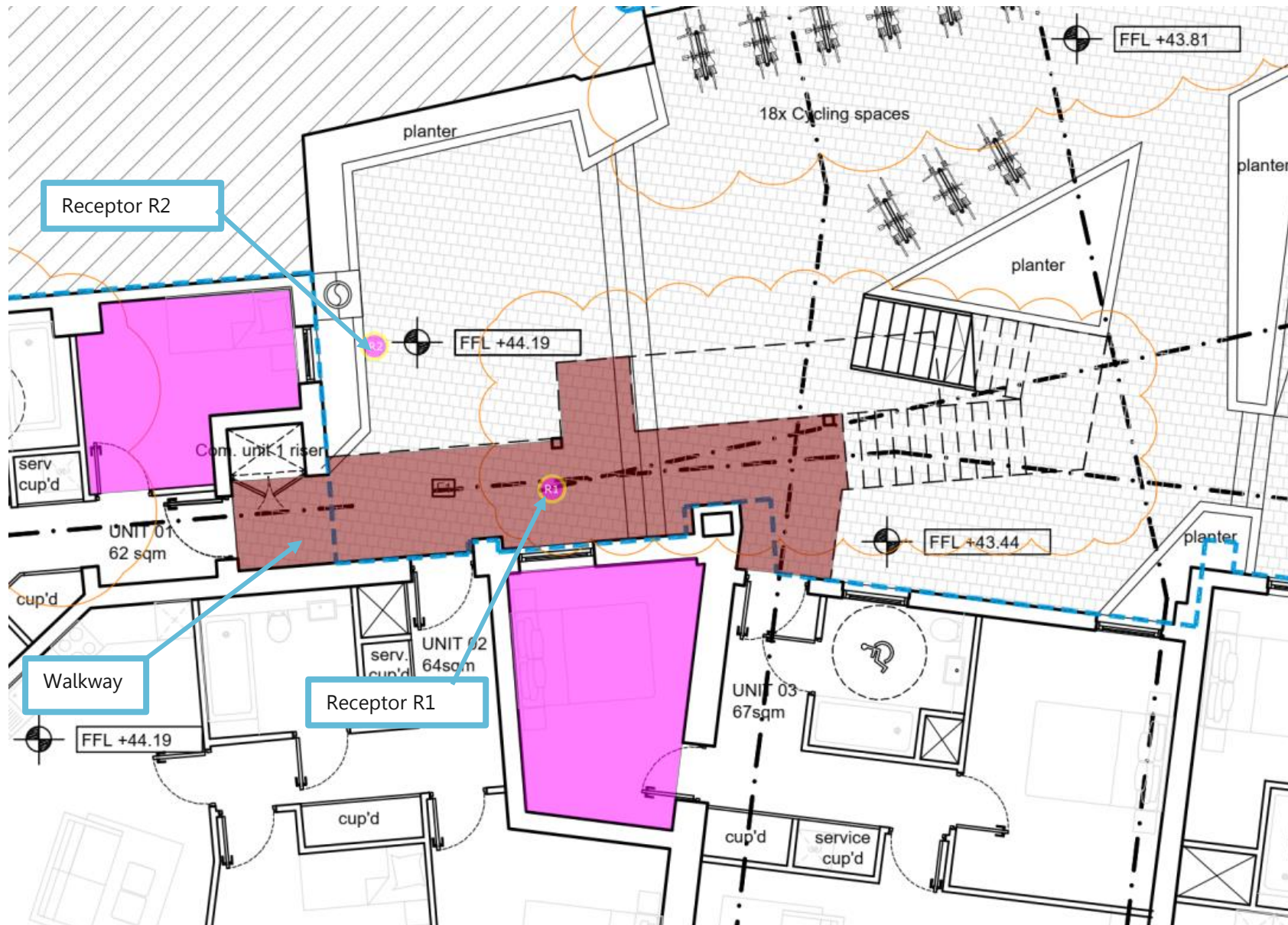
Proposed plant layout



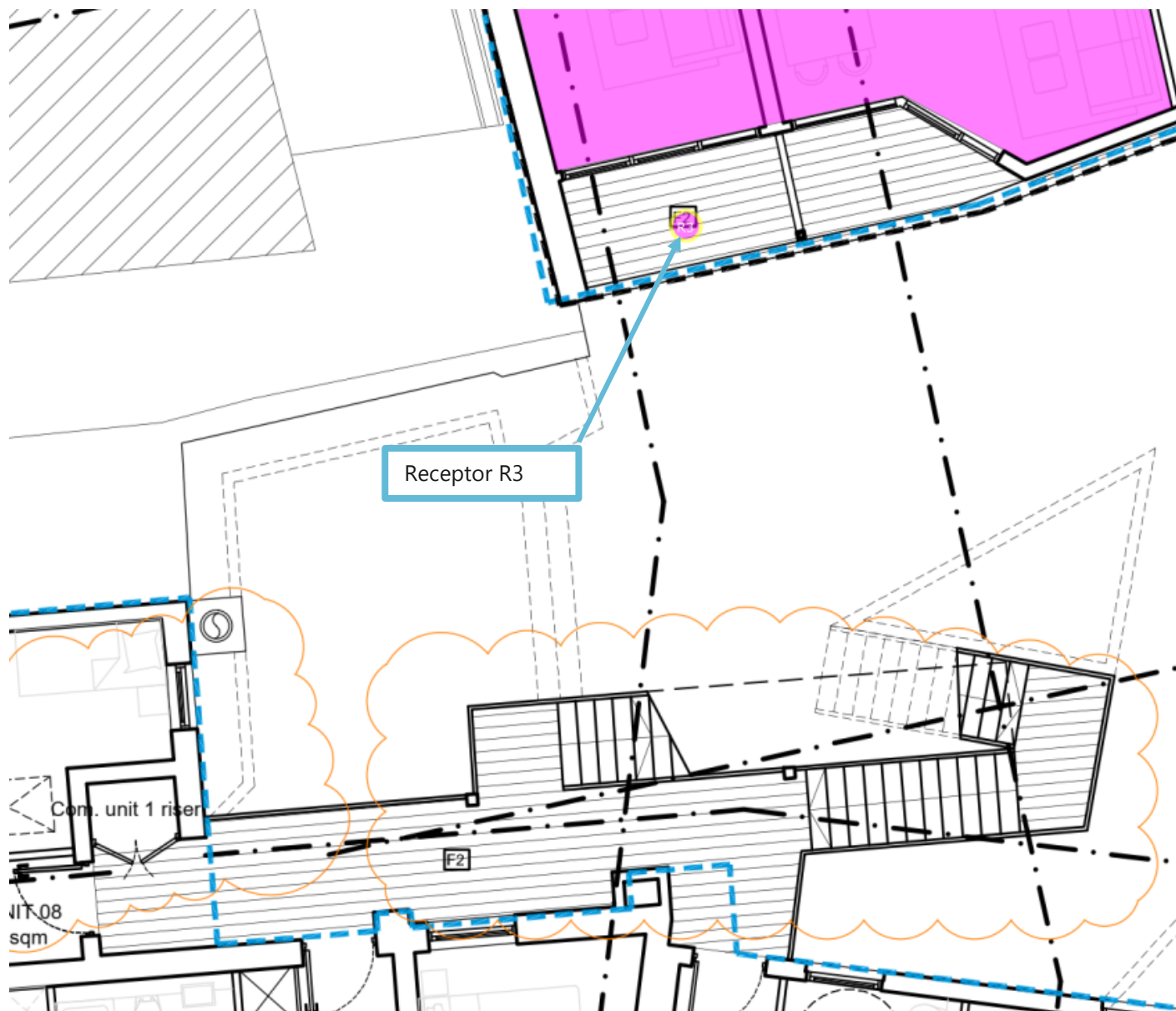
Plan at roof level showing courtyard and building wings



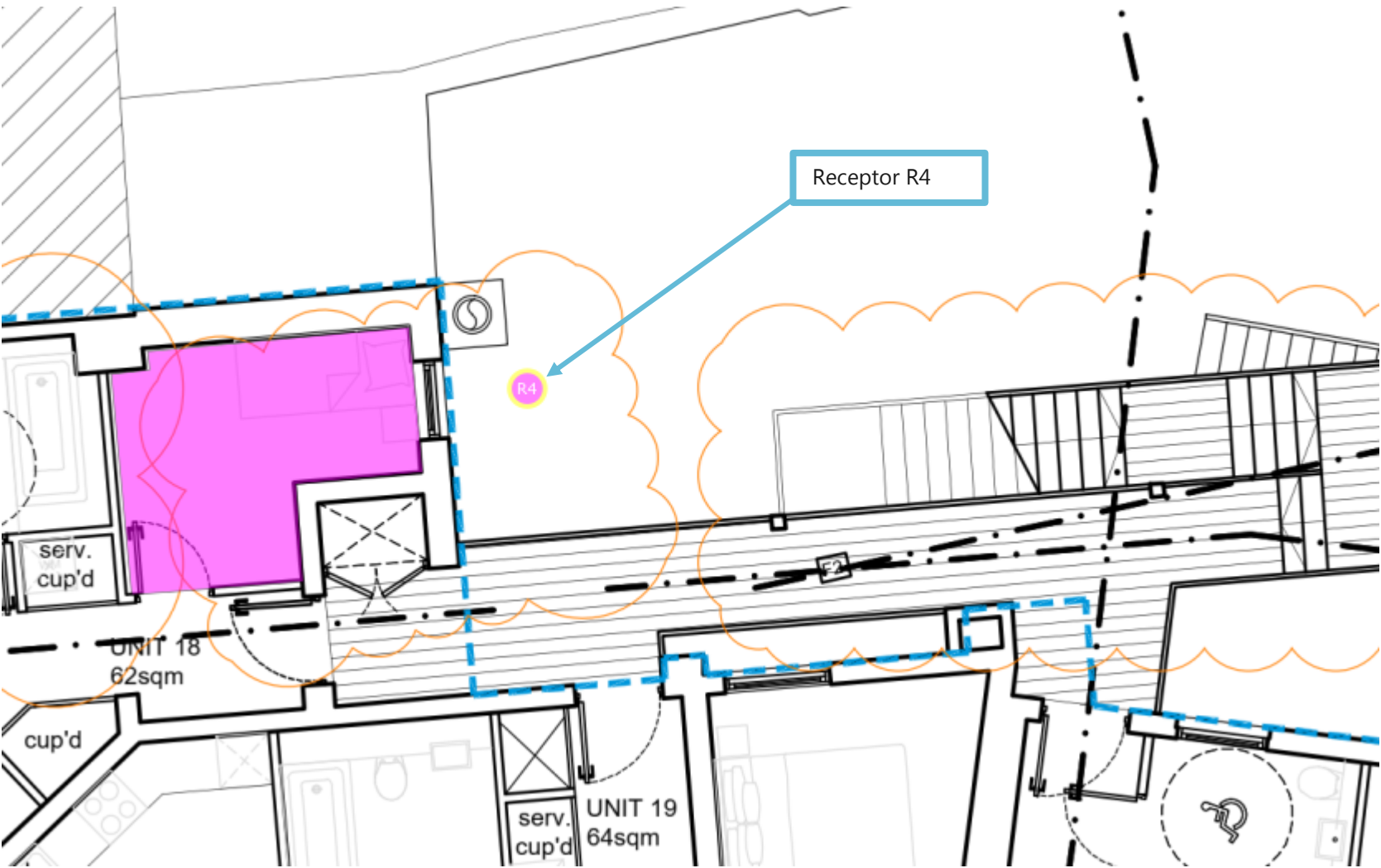
Courtyard - first floor



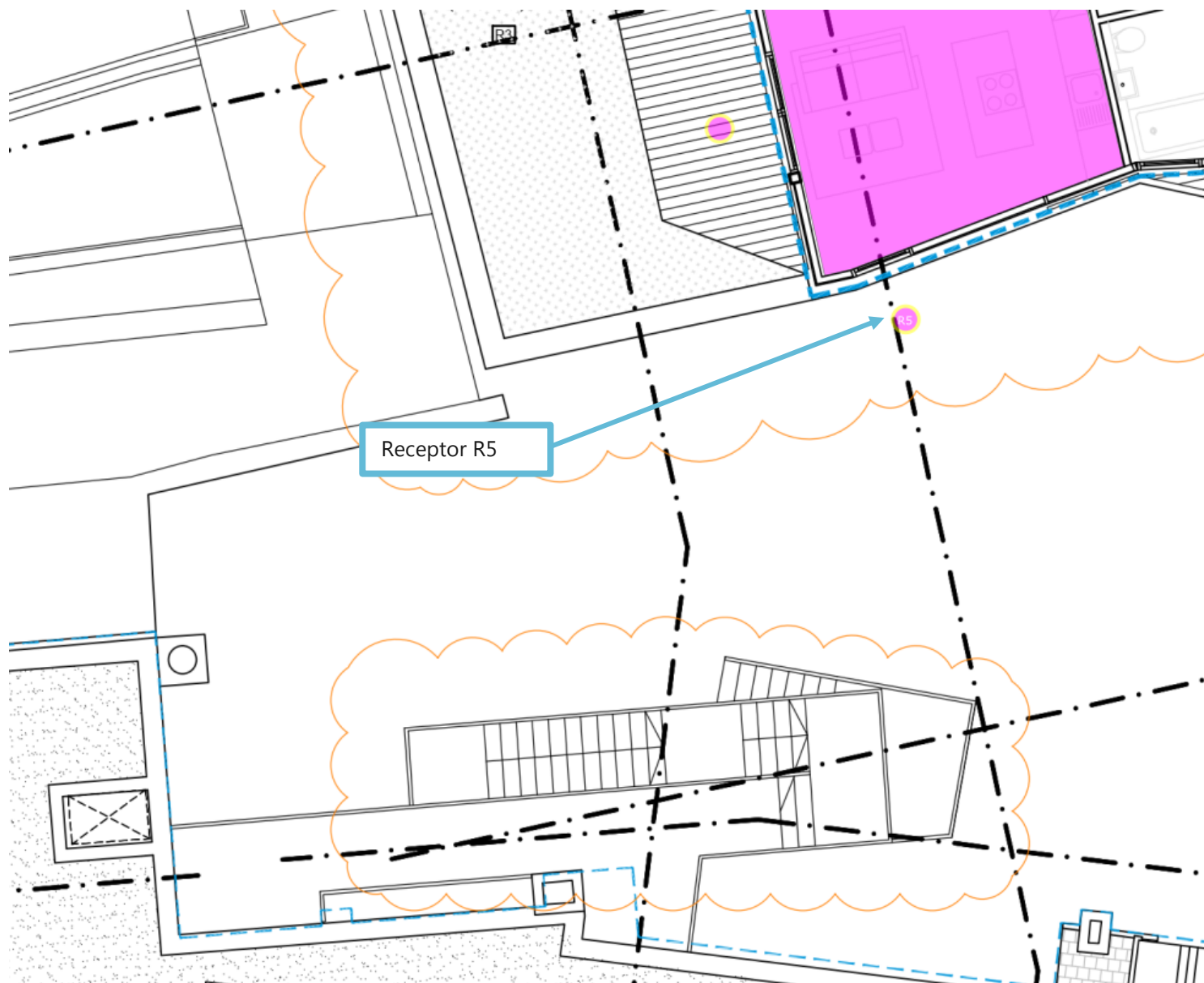
Courtyard – second floor



Courtyard – third floor



Courtyard – fifth floor



Appendix D Attenuation specification

Atmosphere-side attenuator schedule

Fan Ref	Width (mm)	Height (mm)	Length (mm)	Air Vol (m ³ /s)	Pressure Loss (Pa)	Insertion Loss (dB) at octave band centre frequency (Hz)							
						63	125	250	500	1k	2k	4k	8k
F/1	1250	1250	2400	2.99	44	17	34	45	45	45	45	45	45
F/2	900	900	2400	2.30	44	11	25	45	40	40	36	31	27
F/3	250	250	1500	0.07	3	6	12	24	38	45	42	38	29
F/4	600	600	2100	0.64	26	12	27	44	45	45	45	45	45

Fan enclosures and duct lagging

	Attenuation Loss (dB) at octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
F/1 Casing	0	16	13	15	16	16	14	14
F/2 Casing	0	15	14	15	15	15	14	11
Kitchen vertical exhaust duct lagging	7	10	10	10	10	10	10	10

Other attenuation requirements

Condensing units CU/1 and CU/2: screening / enclosure to reduce sound levels by 15dBA at Receptor R1 and R2 and 20dBA at Receptor R2

It is proposed to provide the attenuation required for the fan casings and condensing units by use of a common acoustic screen/enclosure to plant under the first floor walkway

Appendix E Noise level predictions

Summary of predictions

Plant	Resultant at receptor (dB L _{Aeq})				
	R1	R2	R3	R4	R5
F/1 Intake	11	22	22	16	18
F/2 Exhaust	16	17	17	29	20
F/3 Exhaust	13	20	6	7	1
F/4 Exhaust	16	22	8	7	3
CU/1	25	20	19	16	26
CU/2	25	21	19	17	26
F/1 Casing	20	22	22	16	18
F/2 Casing	21	21	24	13	18
Duct Breakout	13	21	8	21	5
Combined sound pressure level, dB L_{Aeq}	30	30	29	30	30

Condensers

Receptor R1

Unit	Distance				Directivity, dB	Screening, dB	Attenuation, dB	Result
	L _{pA}	at / m	m	dB				
CU/1	57	1	3.3	-10	3	-10	-15	25
CU/2	57	1	3.3	-10	3	-10	-15	25

Receptor R2

Unit	Distance				Directivity, dB	Screening, dB	Attenuation, dB	Result
	L _{pA}	at / m	m	dB				
CU/1	57	1	5.6	-15	3	-5	-20	20
CU/2	57	1	4.9	-14	3	-5	-20	21

Receptor R3

Unit	Distance				Directivity, dB	Screening, dB	Attenuation, dB	Result
	L _{pA}	at / m	m	dB				
CU/1	57	1	10.9	-21	3	-5	-15	19
CU/2	57	1	11.4	-21	3	-5	-15	19

Receptor R4

Unit	Distance				Directivity, dB	Screening, dB	Attenuation, dB	Result
	L _{pA}	at / m	m	dB				
CU/1	57	1	10.9	-21	3	-10	-13	16
CU/2	57	1	10.5	-20	3	-10	-13	17

Receptor R5

Unit	Distance				Directivity, dB	Screening, dB	Attenuation, dB	Result
	L _{pA}	at / m	m	dB				
CU/1	57	1	17.1	-25	3	-5	-4	26
CU/2	57	1	17.6	-25	3	-5	-4	26



NSL Ref: **90500**
Project: **Rosa's, Reading**

Compiled by: NAC 27/01/2022

Plant Ref: **F/1 Intake**
Plant Description: **Systemair MUB062 630 D4-IE3 Multibox**

Description	Sound level (dB) at octave band centre frequencies (Hz)										dBA
Source noise level (unattenuated)	63	125	250	500	1k	2k	4k	8k			
System losses	In-duct L _w	86	93	90	87	85	81	77	72	90	
Atmospheric side attenuator		-7	-3	0	-2	-3	-4	-3	-3		
Sound power level leaving terminal	I.L.	-17	-34	-45	-45	-45	-45	-45	-45		
		62	56	45	40	37	32	29	24	45	

Receptor R1	V angle	H angle									
Directivity correction	53	140	800 x 600 (53,140)	-2	-2	-4	-8	-10	-10	-10	
Distance correction	5.9	m	5.9 m	-23	-23	-23	-23	-23	-23	-23	
Screening correction	Screened:			-10	-10	-10	-10	-10	-10	-10	
Surface corrections etc				3	3	3	3	3	3	3	
Resultant at Receptor R1			L _p	30	24	11	2	-3	-8	-11	11

Receptor R2	V angle	H angle									
Directivity correction	42	90	800 x 600 (42,90)	0	0	-1	-1	-6	-9	-9	
Distance correction	7.1	m	7.1 m	-25	-25	-25	-25	-25	-25	-25	
Screening correction	Screened:			0	0	0	0	0	0	0	
Surface corrections etc				3	3	3	3	3	3	3	
Resultant at Receptor R2			L _p	40	34	22	17	9	1	-2	22

Receptor R3	V angle	H angle									
Directivity correction	53	10	800 x 600 (53,10)	1	2	2	3	3	4	4	
Distance correction	10.1	m	10.1 m	-28	-28	-28	-28	-28	-28	-28	
Screening correction	Screened:			0	0	0	0	0	0	0	
Surface corrections etc				3	3	3	3	3	3	3	
Resultant at Receptor R3			L _p	38	33	22	18	15	11	8	22

Receptor R4	V angle	H angle									
Directivity correction	65	90	800 x 600 (65,90)	-1	-1	-1	-3	-7	-12	-12	
Distance correction	12.5	m	12.5 m	-30	-30	-30	-30	-30	-30	-30	
Screening correction	Screened:			0	0	0	0	0	0	0	
Surface corrections etc				3	3	3	3	3	3	3	
Resultant at Receptor R4			L _p	34	28	17	10	3	-7	-10	16

Receptor R5	V angle	H angle									
Directivity correction	61	18	800 x 600 (61,18)	1	1	2	2	2	2	2	
Distance correction	16.6	m	16.6 m	-32	-32	-32	-32	-32	-32	-32	
Screening correction	Screened:			0	0	0	0	0	0	0	
Surface corrections etc				3	3	3	3	3	3	3	
Resultant at Receptor R5			L _p	34	28	18	13	10	5	2	18



NSL Ref: **90500**
Project **Rosa's, Reading**

Compiled by: NAC 27/01/2022

Plant Ref **F/2 Exhaust**
Plant Description **Systemair MUB062 630 D4-IE3 Multibox**

Description	Sound level (dB) at octave band centre frequencies (Hz)										dBA
	Notes.	63	125	250	500	1k	2k	4k	8k		
Source noise level (unattenuated)	In-duct L _w	85	95	91	89	87	82	80	74	92	
System losses		-21	-17	-7	-3	-3	-3	-3	-3		
Atmospheric side attenuator	I.L.	-11	-25	-45	-40	-40	-36	-31	-27		
Sound power level leaving terminal		53	53	39	46	44	43	46	44	52	

Receptor R1	V angle	H angle									
Directivity correction	150	0	450 x 450 (150,0)	-1	-2	-3	-7	-9	-8	-8	-8
Distance correction	9.9	m	9.9 m	-28	-28	-28	-28	-28	-28	-28	-28
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc											
Resultant at Receptor R1			L _p	24	23	8	11	7	7	10	8

Receptor R2	V angle	H angle									
Directivity correction	175	0	450 x 450 (175,0)	-1	-2	-3	-7	-9	-8	-8	-8
Distance correction	8.8	m	8.8 m	-27	-27	-27	-27	-27	-27	-27	-27
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc											
Resultant at Receptor R2			L _p	25	24	9	12	8	8	11	9

Receptor R3	V angle	H angle									
Directivity correction	120	0	450 x 450 (120,0)	-1	-1	-2	-4	-9	-8	-8	-8
Distance correction	10	m	10 m	-28	-28	-28	-28	-28	-28	-28	-28
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc											
Resultant at Receptor R3			L _p	24	24	9	14	7	7	10	8

Receptor R4	V angle	H angle									
Directivity correction	170	0	450 x 450 (170,0)	-1	-2	-3	-7	-9	-8	-8	-8
Distance correction	2.2	m	2.2 m	-15	-15	-15	-15	-15	-15	-15	-15
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc											
Resultant at Receptor R4			L _p	37	36	21	24	20	20	23	21

Receptor R5	V angle	H angle									
Directivity correction	83	0	450 x 450 (83,0)	0	1	1	1	-1	-5	-5	-5
Distance correction	11.5	m	11.5 m	-29	-29	-29	-29	-29	-29	-29	-29
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc											
Resultant at Receptor R5			L _p	24	25	11	18	14	9	12	10



NSL Ref: **90500**
Project **Rosa's, Reading**

Compiled by: NAC 27/01/2022

Plant Ref
Plant Description **F/3 Exhaust
Systemair K 150 M Sileo**

Description	Sound level (dB) at octave band centre frequencies (Hz)										dBA
	63	125	250	500	1k	2k	4k	8k			
Source noise level (unattenuated)	75	68	53	57	52	49	47	31			59
System losses	-17	-12	-7	-3	-1	0	0	0			
Atmospheric side attenuator	-6	-12	-24	-38	-45	-42	-38	-29			
Sound power level leaving terminal	52	44	22	16	6	7	9	2			30

Receptor R1	V angle	H angle									
Directivity correction	23	30	150 x 150 (23,30)	1	2	3	3	4	5	5	5
Distance correction	5.2	m	5.2 m	-22	-22	-22	-22	-22	-22	-22	-22
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R1			L_p	34	27	6	0	-9	-7	-5	-12

Receptor R2	V angle	H angle									
Directivity correction	75	0	150 x 150 (75,0)	1	1	2	2	2	2	2	2
Distance correction	2	m	2 m	-14	-14	-14	-14	-14	-14	-14	-14
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R2			L_p	42	34	13	7	-3	-2	0	-7

Receptor R3	V angle	H angle									
Directivity correction	31	40	150 x 150 (31,40)	1	2	2	3	3	4	4	4
Distance correction	10.6	m	10.6 m	-29	-29	-29	-29	-29	-29	-29	-29
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R3			L_p	27	20	-2	-7	-17	-15	-13	-20

Receptor R4	V angle	H angle									
Directivity correction	87	0	150 x 150 (87,0)	0	1	1	1	-1	-5	-5	-5
Distance correction	8.6	m	8.6 m	-27	-27	-27	-27	-27	-27	-27	-27
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R4			L_p	28	21	-1	-7	-19	-22	-20	-27

Receptor R5	V angle	H angle									
Directivity correction	44	42	150 x 150 (44,42)	1	1	1	2	2	3	3	3
Distance correction	17.1	m	17.1 m	-33	-33	-33	-33	-33	-33	-33	-33
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R5			L_p	23	15	-7	-12	-22	-20	-18	-25



NSL Ref: **90500**
Project **Rosa's, Reading**

Compiled by: NAC 27/01/2022

Plant Ref
Plant Description **F/4 Exhaust
Systemair K315M**

Description	Sound level (dB) at octave band centre frequencies (Hz)									dBA
	Notes.	63	125	250	500	1k	2k	4k	8k	
Source noise level (unattenuated)	In-duct L _w	76	77	75	68	67	67	66	62	74
System losses		-12	-8	-4	-1	0	0	0	0	
Atmospheric side attenuator		-12	-27	-44	-45	-45	-45	-45	-45	
Sound power level leaving terminal		52	42	27	22	22	22	21	17	32

Receptor R1	V angle	H angle									
Directivity correction	23	30	300 x 300 (23,30)	1	2	3	3	4	5	5	5
Distance correction	5.2	m	5.2 m	-22	-22	-22	-22	-22	-22	-22	-22
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R1			L _p	34	25	11	6	7	8	7	3

Receptor R2	V angle	H angle									
Directivity correction	75	0	300 x 300 (75,0)	1	1	2	2	2	2	2	2
Distance correction	2	m	2 m	-14	-14	-14	-14	-14	-14	-14	-14
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R2			L _p	42	32	18	13	13	13	12	8

Receptor R3	V angle	H angle									
Directivity correction	31	40	300 x 300 (31,40)	1	2	2	3	3	4	4	4
Distance correction	10.6	m	10.6 m	-29	-29	-29	-29	-29	-29	-29	-29
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R3			L _p	27	18	3	-1	-1	0	-1	-5

Receptor R4	V angle	H angle									
Directivity correction	87	0	300 x 300 (87,0)	0	1	1	1	-1	-5	-5	-5
Distance correction	8.6	m	8.6 m	-27	-27	-27	-27	-27	-27	-27	-27
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R4			L _p	28	19	4	-1	-3	-7	-8	-12

Receptor R5	V angle	H angle									
Directivity correction	44	42	300 x 300 (44,42)	1	1	1	2	2	3	3	3
Distance correction	17.1	m	17.1 m	-33	-33	-33	-33	-33	-33	-33	-33
Screening correction	Screened:			0	0	0	0	0	0	0	0
Surface corrections etc				3	3	3	3	3	3	3	3
Resultant at Receptor R5			L _p	23	13	-2	-6	-6	-5	-6	-10



NSL Ref: **90500**
Project **Rosa's, Reading**

Compiled by: NAC 27/01/2022

Plant Ref
Plant Description **F/1 Casing
Systemair MUB062 630 D4-IE3 Multibox**

		Sound level (dB) at octave band centre frequencies (Hz)									
		63	125	250	500	1k	2k	4k	8k		
Source noise level (unattenuated)	Sound Power Level	66	77	62	55	55	52	44	36		63
Casing Lagging / Enclosure		I.L.	0	16	13	15	16	14	14		
Attenuated source noise level		66	61	49	40	39	36	30	22		48
Receptor R1											
Distance correction	4.7 m	4.7 m	-21	-21	-21	-21	-21	-21	-21		
Screening correction	Screened:		-10	-10	-10	-10	-10	-10	-10		
Surface corrections etc			3	3	3	3	3	3	3		
Resultant at Receptor R1		L_p	38	33	21	12	11	8	2	-6	20
Receptor R2											
Distance correction	6 m	6 m	-24	-24	-24	-24	-24	-24	-24		
Screening correction	Screened:		-5	-5	-5	-5	-5	-5	-5		
Surface corrections etc			3	3	3	3	3	3	3		
Resultant at Receptor R2		L_p	40	35	23	14	13	10	4	-4	22
Receptor R3											
Distance correction	11.5 m	11.5 m	-29	-29	-29	-29	-29	-29	-29		
Screening correction	Screened:		0	0	0	0	0	0	0		
Surface corrections etc			3	3	3	3	3	3	3		
Resultant at Receptor R3		L_p	40	35	23	14	13	10	4	-4	22
Receptor R4											
Distance correction	11.9 m	11.9 m	-30	-30	-30	-30	-30	-30	-30		
Screening correction	Screened:		-5	-5	-5	-5	-5	-5	-5		
Surface corrections etc			3	3	3	3	3	3	3		
Resultant at Receptor R4		L_p	34	29	17	8	7	4	-2	-10	16
Receptor R5											
Distance correction	18 m	18 m	-33	-33	-33	-33	-33	-33	-33		
Screening correction	Screened:		0	0	0	0	0	0	0		
Surface corrections etc			3	3	3	3	3	3	3		
Resultant at Receptor R5		L_p	36	31	19	10	9	6	0	-8	18



NSL Ref: **90500**
Project: **Rosa's, Reading**

Compiled by: NAC

27/01/2022

Plant Ref: **F/2 Casing**
Plant Description: **Systemair MUB062 630 D4-IE3 Multibox**

		Sound level (dB) at octave band centre frequencies (Hz)								
		63	125	250	500	1k	2k	4k	8k	
		64	78	62	55	55	53	46	37	
Source noise level (unattenuated)	Sound Power Level									
Casing Lagging / Enclosure										
Attenuated source noise level										
Receptor R1										
Distance correction	4.5 m	4.5 m	-21	-21	-21	-21	-21	-21	-21	
Screening correction	Screened:		-10	-10	-10	-10	-10	-10	-10	
Surface corrections etc			3	3	3	3	3	3	3	
Resultant at Receptor R1		L_p	36	35	20	12	12	10	4	-2
Receptor R2										
Distance correction	4.7 m	4.7 m	-21	-21	-21	-21	-21	-21	-21	
Screening correction	Screened:		-10	-10	-10	-10	-10	-10	-10	
Surface corrections etc			3	3	3	3	3	3	3	
Resultant at Receptor R2		L_p	36	35	20	12	12	10	4	-2
Receptor R3										
Distance correction	10.4 m	10.4 m	-28	-28	-28	-28	-28	-28	-28	
Screening correction	Screened:		0	0	0	0	0	0	0	
Surface corrections etc			3	3	3	3	3	3	3	
Resultant at Receptor R3		L_p	39	38	23	15	15	13	7	1
Receptor R4										
Distance correction	11.4 m	11.4 m	-29	-29	-29	-29	-29	-29	-29	
Screening correction	Screened:		-10	-10	-10	-10	-10	-10	-10	
Surface corrections etc			3	3	3	3	3	3	3	
Resultant at Receptor R4		L_p	28	27	12	4	4	2	-4	-10
Receptor R5										
Distance correction	19.2 m	19.2 m	-34	-34	-34	-34	-34	-34	-34	
Screening correction	Screened:		0	0	0	0	0	0	0	
Surface corrections etc			3	3	3	3	3	3	3	
Resultant at Receptor R5		L_p	33	32	17	9	9	7	1	-5



NSL Ref: **90500**
Project **Rosa's, Reading**

Compiled by: **NAC** 27/01/2022

Plant Ref **Systemair MUB062 630 D4-IE3 Multibox**
Plant Description **F/2 Exhaust**

		Sound level (dB) at octave band centre frequencies (Hz)									
		63	125	250	500	1k	2k	4k	8k		
Fan sound power level		85	95	91	89	87	82	80	74		92
Atmosphere-side attenuation		-11	-25	-45	-40	-40	-36	-31	-27		
Sound power level entering duct		74	70	46	49	47	46	49	47		58
Transmission loss/m		-22	-22	-23	-24	-27	-30	-34	-34		
Duct length correction		10	10	10	10	10	10	10	10		
Duct length effect		0	0	0	0	0	0	0	0		
Duct lagging		-7	-10	-10	-10	-10	-10	-10	-10		
Duct breakout sound power level		55	48	23	25	20	16	15	13		
Receptor R1											
Distance correction	3.8 m	3.8 m	-23	-23	-23	-23	-23	-23	-23	-23	
Screening correction	Screened:		0	0	0	0	0	0	0	0	
Near field correction			-1	-1	-1	-1	-1	-1	-1	-1	
Surface corrections etc			3	3	3	3	3	3	3	3	
Resultant at Receptor R1		L_p	34	27	2	4	-1	-5	-6	-8	13
Receptor R2											
Distance correction	1 m	1 m	-11	-11	-11	-11	-11	-11	-11	-11	
Screening correction	Screened:		0	0	0	0	0	0	0	0	
Near field correction			-5	-5	-5	-5	-5	-5	-5	-5	
Surface corrections etc			3	3	3	3	3	3	3	3	
Resultant at Receptor R2			42	35	10	12	7	3	2	0	21
Receptor R3											
Distance correction	8.1 m	8.1 m	-29	-29	-29	-29	-29	-29	-29	-29	
Screening correction	Screened:		0	0	0	0	0	0	0	0	
Near field correction			0	0	0	0	0	0	0	0	
Surface corrections etc			3	3	3	3	3	3	3	3	
Resultant at Receptor R3			29	22	-3	-1	-6	-10	-11	-13	8
Receptor R4											
Distance correction	1 m	1 m	-11	-11	-11	-11	-11	-11	-11	-11	
Screening correction	Screened:		0	0	0	0	0	0	0	0	
Near field correction			-5	-5	-5	-5	-5	-5	-5	-5	
Surface corrections etc			3	3	3	3	3	3	3	3	
Resultant at Receptor R4			42	35	10	12	7	3	2	0	21
Receptor R5											
Distance correction	11.5 m	11.5 m	-32	-32	-32	-32	-32	-32	-32	-32	
Screening correction	Screened:		0	0	0	0	0	0	0	0	
Near field correction			0	0	0	0	0	0	0	0	
Surface corrections etc			3	3	3	3	3	3	3	3	
Resultant at Receptor R5			26	19	-6	-4	-9	-13	-14	-16	5