

Ventilation Services Statement

Project Title – The Galley Restaurant

Project Address – 23 Market Hill Woodbridge IP12 4LX

Scope of Works – Install of ventilation system for new proposed kitchen.

Client – Plaice Architects

Date Issued – 22nd December 2020

Prepared By – Martin Culham

This document has been prepared to detail the proposed ventilation system for The Galley Restaurant Woodbridge. (hereinafter known as 'the site')

With this proposal the following documents can be found.

1. Extent of existing and proposed works.
2. Odour Control Assessment
3. Noise impact assessment.
4. Odour Control Data Sheets

CK Direct
15 Tresham Road
Orton Southgate
Peterborough
PE2 6SG
T – 01733 230378
W – www.ckdirect.co.uk

Appendix 1 Extent of existing and proposed services

Proposed Ventiation Services

The premises plans to install a new back of house kitchen with the renovated toilet block to the rear of the premises.

The extract system will have a stainless steel wall mounted extract canopy manufactured by CK Direct. The canopy shall be served by an extract system which will be installed internal to the building with the fresh air system in the back alley to toilet block.

The canopy shall have a set of grease separators for the removal of the initial grease from the cooking process before it enters the duct system.

The extract air shall be pulled through the canopy to the duct system, for the removal of grease smoke and odours we will install a two stage system with ESP for the reduction of smoke and grease out of air steam ozone injection for the reduction of odour.

The odour control has been specified on the EMAQ risk assessment scoring process.

Dispersion – Poor - Not low level but below eaves. **Score 15**

Proximity of Receptors – Close – Less than 20 meters – **Score 10**

Size of Kitchen – Medium – Up to 30 covers – **Score 3**

Cooking type – Medium – **Score 4**

Total Score 27 – High level odour control required. – ESP and Ozone

The extract system shall incorporate noise mitigation measure in the form of duct mounted attenuators.

Appendix 2 – Noise Assessment

CK Direct
15 Tresham Road
Orton Southgate
Peterborough
PE2 6SG
T – 01733 230378
W – www.ckdirect.co.uk

Alterations to The Galley Restaurant,
Woodbridge – Supply and Extract Noise
The Galley, 21 Market Hill, Woodbridge,
IP12 4LX



Noise Impact Assessment

TECHNICAL REPORT

35753-R2

Alterations to The Galley Restaurant, Woodbridge – Supply and Extract Noise Noise Impact Assessment

Prepared for: CK Direct Ltd, 15 Tresham Road, Orton, Southgate, Peterborough PE2 6SG

Site location: The Galley, 21 Market Hill, Woodbridge, IP12 4LX

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Cornwall Suite, Dencora Business Centre, Whitehouse Road, Ipswich IP1 5LT
 Tel: 01473 464 727 | info@sscmail.co.uk | www.soundsolutionconsultants.co.uk
 VAT No. 844 9267 90 | Registration No. 5651834
 Registered Address: 2 Lemons Hill, Tattingstone, Ipswich, Suffolk IP9 2NH

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D. Attwell BEng. (Hons) AMIOA Acoustic Consultant		S. Skingle BSc. (Hons) MAES MIOA Principal Acoustic Consultant	
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1 INTRODUCTION

- 1.1 A development has been proposed at The Galley, 21 Market Hill, Woodbridge, IP12 4LX (hereinafter, “The Site”). A plan highlighting The Site has been provided in Appendix B with development proposal drawings in Appendix C.
- 1.2 This document has been prepared to support an application for a proposed kitchen extension at The Site and provides an assessment of supply and extract plant noise impacts from the proposed development using BS 4142 methodology, and commensurate mitigation design advice.
- 1.3 The existing site is in a mixed commercial/residential area, across from Woodbridge Town Square. The proposed site is surrounded by residential buildings however the nearest noise sensitive window is indicated in Appendix D, identified as the first-floor residential flat above Wild Strawberry Café, directly adjacent the existing kitchen, separated by a private footpath. This window is not the nearest residential receptor to the proposal but is considered the worst-case as it faces down to where the proposed plant inlet/outlets would be located and would not benefit from any external screening.
- 1.4 The proposal has been considered in line with the operating hours of the usage, which has been confined to daytime periods (07:00 – 23:00) only.
- 1.5 A Glossary of Acoustic Terms has been provided in Appendix A that may assist with the terminology used within this report.



2 NOISE CRITERIA

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

2.1 The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) in March 2012. The latest revision of the NPPF is dated June 2019.

2.2 The Framework replaced most planning policy, circulars and guidance including Planning Policy Guidance 24: Planning and Noise (1994). The NPPF defines the Government's planning policies for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government's stated purpose in producing the NPPF was to streamline policy so the planning process is less restrictive, to give a more easily understood framework for delivering sustainable development.

2.3 Under the heading of "Conserving and Enhancing the Natural Environment", specific noise pollution aims are detailed in Section 170 of the NPPF. It is stated that planning policies and decisions should contribute to and enhance the natural and local environment by:

"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution..."

2.4 Considering "Ground Conditions and Pollution" it is also stated in Section 180 of the NPPF that planning policies and decisions should also ensure that any new development is appropriate for its location considering the likely effects of pollution on health, living conditions, the natural environmental, sensitivity of the site and wider area and impacts that could arise from the development. The aims in doing so should:

- mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.5 It is stressed that the above references to noise should not be considered in isolation and that the theme, referred to as the "golden thread" of sustainability that runs through the NPPF is integral to noise.

2.6 The NPPF acknowledges that there is a host of existing sources of national and international guidance which can be used, in conjunction with the Framework, to inform the production of Local Plans and decision making.



NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

2.7 The Noise Policy Statement for England (NPSE) was published in March 2010. It sets out the long-term vision of government noise policy, which is fundamentally to: “Promote good health and good quality of life through the effective management and control of noise within the context of Government policy on sustainable development”. The vision is supported by three key aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and reduce to a minimum, other adverse impacts on health; and
- Where possible, contribute to the improvement of health and quality of life.

2.8 The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The NPSE adopts the following concepts, to help consider whether noise is likely to have “significant adverse” or “adverse” effects on health and quality of life:

SOAEL – Significant Observed Adverse Effect Level.

This is the level above which significant adverse effects on health and quality of life occur.

LOAEL – Lowest Observed Adverse Effect Level.

This is the level above which adverse effects on health and quality of life can be detected.

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 the noise.

2.9 The NPSE emphasises that:

“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available (Defra, 2010).”



NATIONAL PLANNING PRACTICE GUIDANCE (PPG)

2.10 Revised Planning Practice Guidance was released in March 2014 to support the NPPF and last updated in July 2019. The Guidance stipulates that Local Planning Authorities' plan making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

2.11 The table below is in the Guidance to assist recognising “when noise could be a concern”.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Unnoticeable	No Effect	NOEL	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	
		LOAEL	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for sleep disturbance. Affects acoustic character of the area and creates a perceived change in quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		SOAEL	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 1 – Planning Practice Guidance to Support National Planning Policy Framework.

BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

- 2.12 The British Standard BS 4142:2014 +A1:2019 “Methods for Rating and Assessing Industrial and Commercial Sound” describes methods for rating and assessing sound of an industrial or commercial nature. The scope of the standard includes relevant topics for commercial development, such as sound from fixed installations (mechanical and electrical plant and equipment). The standard is applicable to the determination of rating levels for sources of sound as well as ambient, background and residual levels. The Standard was amended in June 2019.
- 2.13 Certain acoustic features can increase the significance of impact that might be expected from a comparison of the specific sound level to the background sound level where these features are likely to affect perception and response. Where such features are present at the assessment location, a character correction (or penalty) to the specific sound level is made to obtain the rating level. This can be approached from subjective, objective and reference methods.
- + Tonality: A correction of 0dB to +6dB for sound ranging from not tonal to prominently tonal.
 - + Impulsivity: A correction of up to +9dB can be applied for sound that is impulsive.
 - + Intermittency: A penalty of +3dB can be applied if on/off conditions are readily distinctive within the reference time interval over the period of the greatest amount of on-time.
 - + Other characteristics: A penalty of +3dB can be applied in the absence of all other defined characteristics, where the specific sound contains a distinctive feature in the residual acoustic environment.
- 2.14 Character corrections are normally added arithmetically where more than one feature is present, however, if any single feature is dominant to the exclusion of others, then it may be appropriate to reduce the correction or apply a zero correction for the minor characteristics. The rating sound level is equal to the specific sound level if there are no acoustic features present or expected to be present.
- 2.15 The significance of sound depends upon both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. An initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level. The context of the development is important in assessing the impact.
- 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 significant adverse

impact. Where the rating level does exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

- 2.16 The scope of the Standard recognises that human response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact can depend on various factors such as the exceedance to the background level, its absolute level, time of day and change in environment, as well as local attitudes to the source of sound and character of the neighbourhood.



3 ENVIRONMENTAL SURVEY SUMMARY

3.1 An environmental survey has been undertaken between Wednesday 11th to Thursday 12th November 2020 to quantify sound levels at the development site in accordance with BS 4142. Details of the study have been provided in Appendix D with results summarised herein this section.

BACKGROUND AND RESIDUAL SOUND LEVELS

3.2 The 'typical' background sound levels have been reported in this section in accordance with BS 4142 as established from histograms of the recorded dB $L_{A90, 15min}$ data at the Measurement Position, shown in Appendix D. The measurement location has been used to describe the underlying climate at the nearest noise sensitive residential window, at a height of 4.5m above ground level (AGL) during proposed operating periods.

3.3 In line with Section 8.1.4 of BS 4142, the monitoring duration should reflect the range of background noise levels for the period assessed. In practice, there is no single level for background sound as this is a fluctuating parameter, although a representative value of the period should be used. Note this is not either the lowest or mean average value of dB $L_{A90, 15min}$.

Measurement Data		Free Field Sound Pressure Level, dB $L_{A90, T}$ re. 20 μ Pa		
Date Range	Time HH:MM	Measurement Position, 4.5m AGL		
		Range	Representative	Period Description
11-12/11/2020	07:00 – 23:00	57 - 64	60	Daytime

Table 2 – Background sound level summary, dB $L_{A90, T}$.

3.4 Existing kitchen plant (located within the restaurant's external storage area) dominates the sound climate throughout the measurement period. For this reason, the background sound level does not vary by any significant degree during daytime hours. It is understood that this plant activity is typical for a working day at The Site.

3.5 The residual sound level data in this section has been summarised from raw data in Appendix D, generally in accordance with the requirements of BS 4142. The snapshots of environmental sound are taken to be representative of the underlying noise climate without the proposed development in operation and are used to evaluate the environmental noise impact for the development.

Measurement Data		Free Field Sound Pressure Level, dB $L_{Aeq, T}$ re. 20 μ Pa		
Date Range	Time HH:MM	Measurement Position, 4.5m AGL		
		Range dB $L_{Aeq, T}$	Representative* dB $L_{Aeq, T}$	Period Description
11-12/11/2020	07:00 – 23:00	58 - 64	64	Day

* Representative residual levels have been noted at times of representative background sound.

Table 3 – Residual sound level summary, dB $L_{Aeq, T}$.

4 NOISE IMPACT ASSESSMENT

- 4.1 The impact of activity noise from the proposed development on the surrounding environment will depend on several factors, including (but not limited to) the time of day, frequency of occurrence and nature of sound source. Development activities will naturally pose greater noise risk where they are permissible during noise sensitive periods, where the likelihood of annoyance or sleep disturbance increases. Human response to noise depends on sociological factors, attitudes and perceptions which can be difficult to define and account for any individual case.
- 4.2 The recognised methodology for assessment has been taken from BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* which includes consideration of sound from fixed plant installations. The numerical assessment has been provided below for relevant periods of proposed operation, following the definition of specific sound levels.
- 4.3 The proposed plans for the supply & extract system are shown in Appendix C; the external plant is to be located along the south western wall of the proposed kitchen.
- 4.4 Following a site inspection, it was recommended to orientate the proposed plant so that the termination point faces the south east (towards the existing restaurant buildings). The design of the plant has been considered in conjunction with acoustic concerns to provide suitable protection to nearby sensitive receptors.

BS 4142 ASSESSMENT OF PROPOSED SUPPLY AND EXTRACT SYSTEM

- 4.5 Based on information presented in the manufacturer's datasheet (shown in Appendix C), the sound level of the proposed mechanical plant has been calculated, based upon the method provided by CIBSE¹.
- 4.6 The CIBSE calculation process comprises four components, the sound level from the extract outlet, the extract breakout, the supply inlet, and the supply breakout. These contribute to the overall level experienced at the nearest sensitive window, identified as the first-floor residential flat located above Wild Strawberry Café (indicated in Appendix D, Figure D2). A nominal distance of 8 - 9 m has been used between the proposed plant and the nearest residential window.

Plant Extract Calculation											
#	Procedure	Data	Octave Band Level dB								Total
			63	125	250	500	1k	2k	4k	8k	
1	Extract Outlet - In duct Sound Power Level	L _w dB	74	90	85	77	74	67	63	60	92
2	Duct losses	0.6 x 2.0	-1.1	-0.7	-0.5	-0.2	-0.2	-0.2	-0.2	-0.2	-

¹ Noise and vibration control for building services equipment. CIBSE Guide B4:2016. The Chartered Institution of Building Services Engineers CIBSE, 2016.



Plant Extract Calculation											
#	Procedure	Data	Octave Band Level dB								Total
			63	125	250	500	1k	2k	4k	8k	
3	Bend losses	x 1	0	-1	-4	-6	-4	-4	-4	-4	-
4	End reflection (based on diameter)	dB	-6.8	-3.1	-1.1	-0.3	-0.1	0.0	0.0	0.0	-
5	Sound power level at exit point	L _w dB	66	85	79	70	70	63	59	56	75
6	Attenuator type R02 6-1200 Melinex lined	dB	-3	-6	-12	-18	-17	-20	-13	-11	-
7	Power to pressure over 8 m	L _p dB	-26	-26	-26	-26	-26	-26	-26	-26	-
8	Façade effect	dB	3	3	3	3	3	3	3	3	-
9	A weighting	dB	-26	-16	-9	-3	0	1	1	-1	-
10	Sound Pressure level at 8 m from extract outlet (at receptor)	L _{pA} dB(A)	14	40	36	26	30	21	24	21	42

Table 4 – Proposed plant extract system sound levels at receptor (at requested duty of 1.3m³/s)

Plant Supply Calculation											
#	Procedure	Data	Octave Band Level dB								Total
			63	125	250	500	1000	2000	4000	8000	
1	Supply Inlet - In duct Sound Power Level	L _w dB	88	67	64	69	56	52	49	47	88
2	Duct losses	0.6 x 1.2	-1.1	-0.7	-0.5	-0.2	-0.2	-0.2	-0.2	-0.2	-
3	Bend losses	x 0	0	0	0	0	0	0	0	0	-
4	End reflection (based on diameter)	dB	-6.8	-3.1	-1.1	-0.3	-0.1	0.0	0.0	0.0	-
5	Sound power level at exit point	L _w dB	80	63	62	68	56	52	49	47	81
6	Attenuator type R02 6-600	dB	-2	-3	-6	-7	-12	-14	-11	-10	-
7	Power to pressure over 9 m	L _p dB	-27	-27	-27	-27	-27	-27	-27	-27	-
8	Façade effect	dB	3	3	3	3	3	3	3	3	-
9	A weighting	dB	-26	-16	-9	-3	0	1	1	-1	-
10	Sound Pressure level at 9 m from supply outlet (at receptor)	L _{pA} dB(A)	28	20	24	34	20	15	15	12	36

Table 5 – Proposed plant supply system sound levels at receptor (at requested duty of 1.1m³/s)

4.7 In addition to sound from the outlet and inlets, the breakout from the mechanical plant is also calculated and the result logarithmically summed. The calculation process for these contributing factors is included within Appendix E.

4.8 The resultant sound pressure level from the proposed mechanical plant at the receptor is shown in Table 6 below.

Source	Sound Pressure level (L_{pA}) at the nearest residential façade								
	Octave Band Level dB(A)								Total dB(A)
	63	125	250	500	1k	2k	4k	8k	
Extract Outlet	14	40	36	26	30	21	24	21	42
Extract Breakout	19	35	32	21	17	7	1	-3	37
Supply Inlet	28	20	24	34	20	15	15	12	36
Supply Breakout	24	21	19	14	10	7	4	-5	27
Sum	30	41	38	35	30	22	24	21	44

Table 6 – Proposed plant sound pressure levels at receptor (resultant level).

4.9 The following numerical assessment is presented in accordance with BS 4142:2014 A1:2019, as to provide a comparison between the rating sound level of the proposal against the background sound level existing prior to development.

4.10 The following assessment is based on daytime operations only. Kitchen operations are understood to start after 09:30 and conclude before 22:00, however the full daytime period (07:00 – 23:00) has been assessed to ensure a robust assessment and allow for some flexibility, if required.

BS 4142 assessment of proposed supply & extract impact at adjacent first-floor receptor		
Result	Day 07:00 – 23:00	Commentary
Background sound level, dB $L_{A90, T}$	60	Estimated as representative from histogram of background sound levels, from Table 2 and Appendix D.
Residual sound level, dB $L_{Aeq, T}$	64	Representative based on the underlying range of measured levels in Table 3, as occurring during times of background sound.
Reference time interval	1-hour	Relevant time interval for assessment period from BS 4142.
Predicted sound level at receptor	44	As derived in Table 6.

BS 4142 assessment of proposed supply & extract impact at adjacent first-floor receptor		
Result	Day 07:00 – 23:00	Commentary
On-time correction	0	Assumed continuous in worst-case hour of the day.
Specific sound level, dB $L_{Aeq, T}$	44	
Acoustic feature correction, dB	3	Precautionary acoustic correction of 3 dB applied. Tonality unlikely to be audible at receptor given the existing character of the sound climate.
Rating level, dB $L_{Ar, Tr}$	47	The rating level is equal to the specific sound level plus acoustic feature corrections.
Excess of rating level over background sound level	-13	
Assessment indicates likely indication of: *depending on the context	Low Impact*	Where the rating level does not exceed the background sound level during daytime use, this is an indication of the specific sound source having a low impact, depending on the context.
Uncertainty of the assessment	<i>Insignificant</i>	Where the excess of the background sound level over the rating level is high, the uncertainty of the measurement does not have any significance on the outcome of the assessment.

Table 7 – Numerical assessment in accordance with BS 4142 at nearest noise sensitive location.

- 4.11 The numerical assessment in Table 7 has highlighted a low impact at the nearest noise sensitive location during the proposed daytime operation, where the rating sound level is predicted lower than 10 dB below the representative background sound level.
- 4.12 It has been acknowledged that this needs to be considered in context, following the requirements of BS 4142. The concept of “context” has been notably emphasised in Section 11 of BS 4142 when considering numerical impacts established from applying the standard.
- 4.13 Providing the proposed supply and extract systems are installed with suitable attenuators (like those detailed in Tables 4 and 5), sound levels would be less than 10 dB below the background sound level. It has been realised in context that the ambient sound level should not change by any perceptible degree due to the instatement of the development. Development activities would therefore be largely indistinguishable. These measures would also ensure that ambient creep is avoided at this receptor and the surrounding area.
- 4.14 The consideration of context relevant to the assessed sound sources has been viewed to support the notion of a “low impact” assessment in accordance with BS 4142.

STATEMENT OF UNCERTAINTY

4.15 Uncertainty inevitably limits the accuracy associated with all steps of any noise assessment, including measurement, calculation, or prediction. Factors include, but are not limited to:

- The inherent accuracy limitation of methodology in Standards and guidance.
- Variability in meteorological conditions.
- The accuracy of sound source input data of a calculation.

4.16 It is imperative to minimise the uncertainty to a level commensurate with the intention of the assessment objective. Measures taken in this assessment to minimise uncertainty are:

- Baseline sound levels have been measured over a reasonably long period and therefore provide a good indication of representative background and residual sound levels.
- Sound level measurements were undertaken in accordance with recognised Standards, using a tall environmental windshield and were undertaken during reasonable weather conditions e.g. acceptably low wind speeds and precipitation.
- A direct measurement location was used and is considered to provide a representative basis for background noise levels at the nearest receiver locations to the development.
- Field calibration checks were undertaken before and after measurements to record very low levels of equipment drift.
- The sound source data has been provided from site measurements.
- The calculations have been conservative as not to under-predict the resulting impacts.

4.17 The aforementioned measures have been considered to reduce uncertainty to a level considered not to have any significance to the outcome of this assessment.



5 PREDICTED NOISE IMPACTS AND PLANNING

- 5.1 The evaluated noise impacts in this report should be considered by East Suffolk Council mindful of the National Planning Policy Framework and Noise Policy Statement for England, which currently define the policy and decision-making requirements for planning and noise.
- 5.2 In deciding a suitable planning outcome, it must be recognised that noise management is a complex issue and at times requires complex solutions. There is no European or national noise limit which must be met. To assist in defining what level of noise impacts should be acceptable in sustainable development, the NPSE refers to established concepts from toxicology that are currently being applied to noise impacts.
- 5.3 The NPSE suggests that noise levels above the SOAEL should be avoided and that if noise levels fall between the LOAEL and SOAEL all reasonable steps should be taken to minimise and mitigate adverse effects while also considering the guiding principles of sustainable development. This does not mean that adverse effects cannot occur from a noise-generating development.
- 5.4 The range of noise impacts reviewed for the proposed development have been deemed acceptable with respect to overarching requirements for planning and noise, where resulting impacts have been anticipated around the LOAEL threshold of the NPSE.
- 5.5 **It is expected that the development sound resulting from the proposed development will be largely unnoticeable, or, just perceptible during the most noise sensitive periods of assessment. In the worst-case, it is possible for the sound to be audible, but the sound is not expected to cause any change in behaviour or attitude. In this regard, the development may marginally affect the acoustic character of the area during the most sensitive periods of the evening, but not to the extent that there is a perceived change in quality of life.**
- 5.6 In accordance with overarching planning requirements, measures have been satisfactorily considered to “*mitigate and minimise adverse impacts on health and quality of life*” which can be secured on the development by conditional approval, if necessary, to include:
- Suitable silencer specifications for mechanical plant systems:
 - Extract system: attenuator type R02 6-1200 Melinex lined (or equivalent)
 - Supply system: attenuator type R02 6-600 (or equivalent)



6 CONCLUSIONS

- 6.1 An assessment of environmental sound levels has been carried out for a proposed development at The Galley, 21 Market Hill, Woodbridge, IP12 4LX. Environmental sound levels have been taken from a site survey at the boundary of the development site.
- 6.2 A noise impact assessment has been carried out in line with BS 4142 methodology. Cumulative rating sound levels have been predicted at the nearest residential receptor, based on measurements and operations defining the development emission of proposed use.
- 6.3 The numerical assessment in Section 4 has predicted rating levels 13 dB below the existing background sound level providing specifications are adhered to. Predicted noise impacts have not been modified when considering the context of the site.
- 6.4 It has been concluded from the findings of this assessment that noise should not present reasonable grounds for planning refusal. The likely acoustic effects have been established about the LOAEL threshold of the NPSE, such that noise may be heard but does not cause any change in behaviour or attitude. It may slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.
- 6.5 Where it is deemed appropriate to grant approval of the proposed development, commensurate noise mitigation and management can be controlled by ensuring noise rating levels of 50 dB are not exceeded at the nearest residential windows from the proposed plant which can be achieved by installation of suitable attenuators specifications, as detailed within this report.



Appendix A: Glossary of Acoustic Terms

'A' weighting dB(A): Correction applied to the frequency range of a noise in order to approximate the response of the human ear. Noise measurements are often A-weighted using an electronic filter in the sound level meter.

Attenuation: Sound reduction, measured in decibels (dB).

Ambient Sound: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far. Note: The ambient sound comprises the residual sound and the specific sound when present.

Background sound level: A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Calibration: A check of the function of a sound level meter by comparing the meter reading with a known sound pressure level.

Decibel (dB): The unit of sound level and noise exposure measurement. The range of audible sound pressures is approximately 0 dB to 140 dB.

Frequency (Hz): The pitch of the sound, measured in Hertz.

L_{Aeq,T}: The A-weighted equivalent continuous sound pressure level during a period. It is the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period, T.

Octave-bands: A division of the frequency range into recognised bands.

Rating level, L_{Ar,Tr}: The specific sound level plus any adjustment for the character of the sound.

Residual sound: Ambient sound remaining in the absence of the specific sound or that it is suppressed as not to contribute to the ambient sound level.

Residual sound level, L_r or L_{eq,T}: The equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given reference time interval, T.

Sound pressure level (SPL): The basic measure of sound, expressed in decibels, usually measured with an appropriate frequency weighting (e.g. the A-weighted SPL in dB(A)).

Sound power level (L_w): The sound energy radiated per unit time by a sound source measured in watts (W). Sound power can be weighted (e.g. A-weighted) and is not influenced by environmental or physical factors such as weather or distance.

Specific sound: Sound source being assessed.

Specific sound level, L_s or L_{eq,T}: The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval, T.



Appendix B: Annotated Location Plan

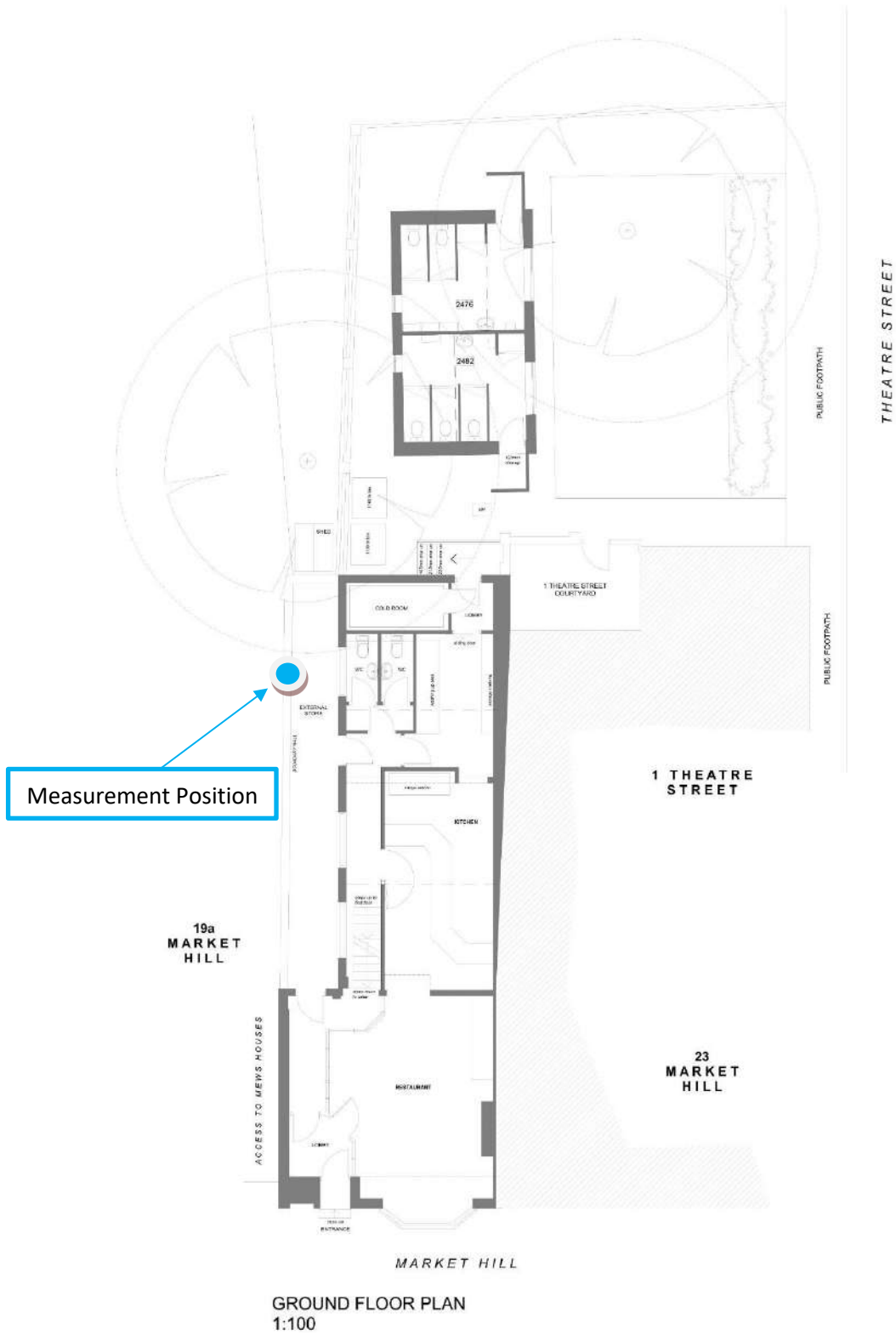


Figure B1 – Location Plan, with Measurement Positions highlighted (4.5m above ground level).

Appendix B: Annotated Location Plan

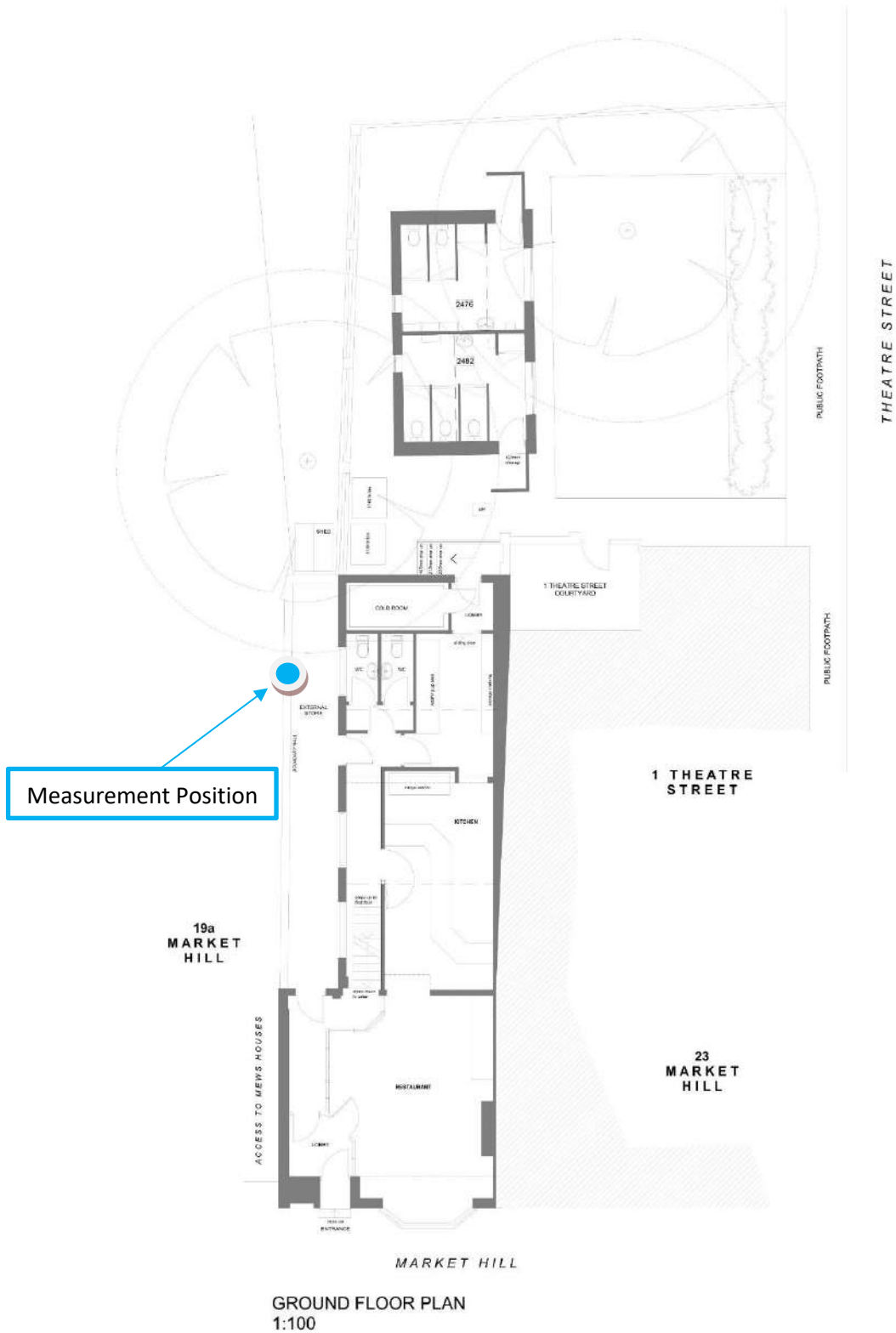


Figure B1 – Location Plan, with Measurement Positions highlighted (4.5m above ground level).

Appendix C: Scheme Design

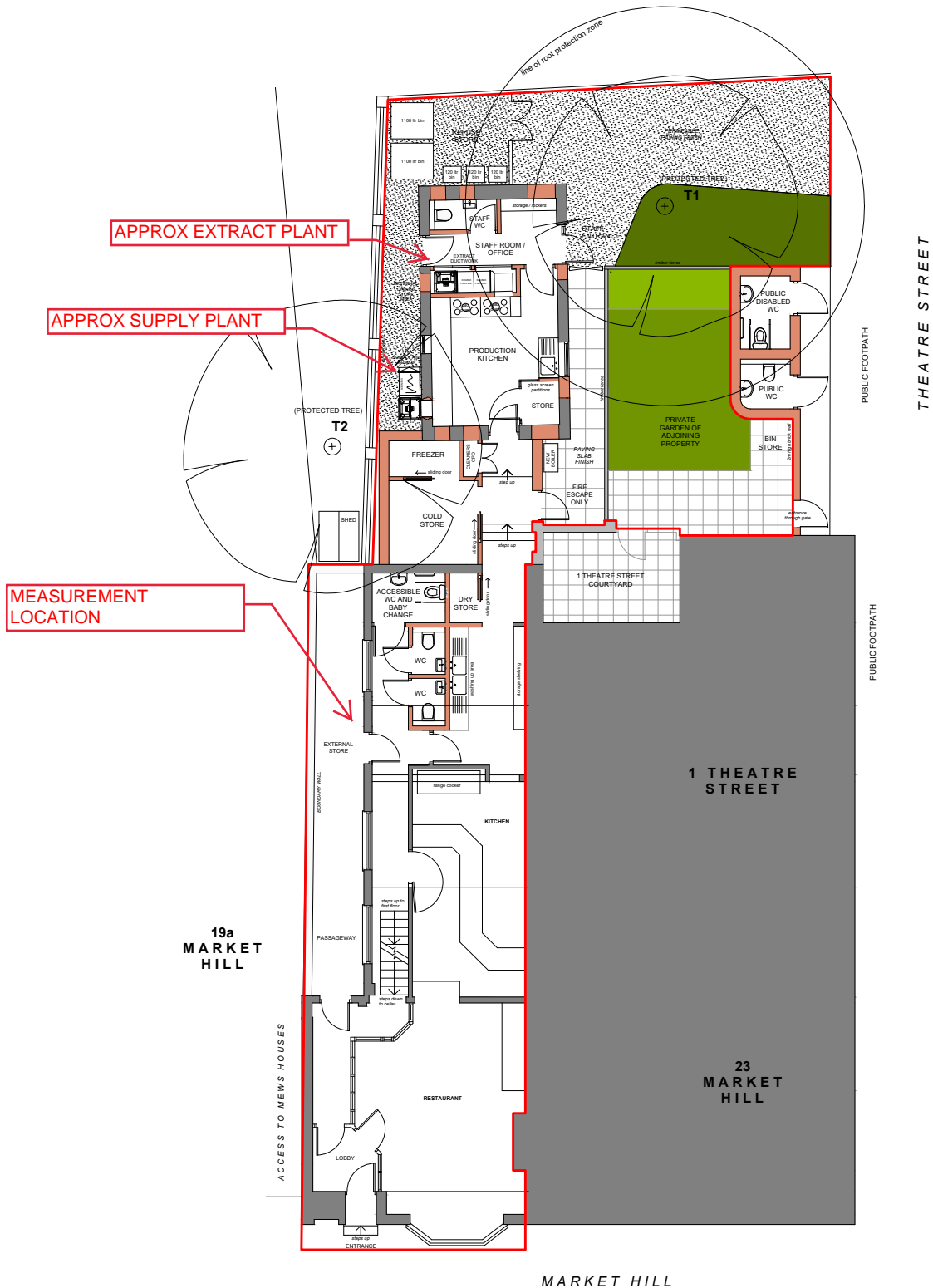


Figure C1 – Proposed development site plan with proposed plant location and Measurement Position highlighted.

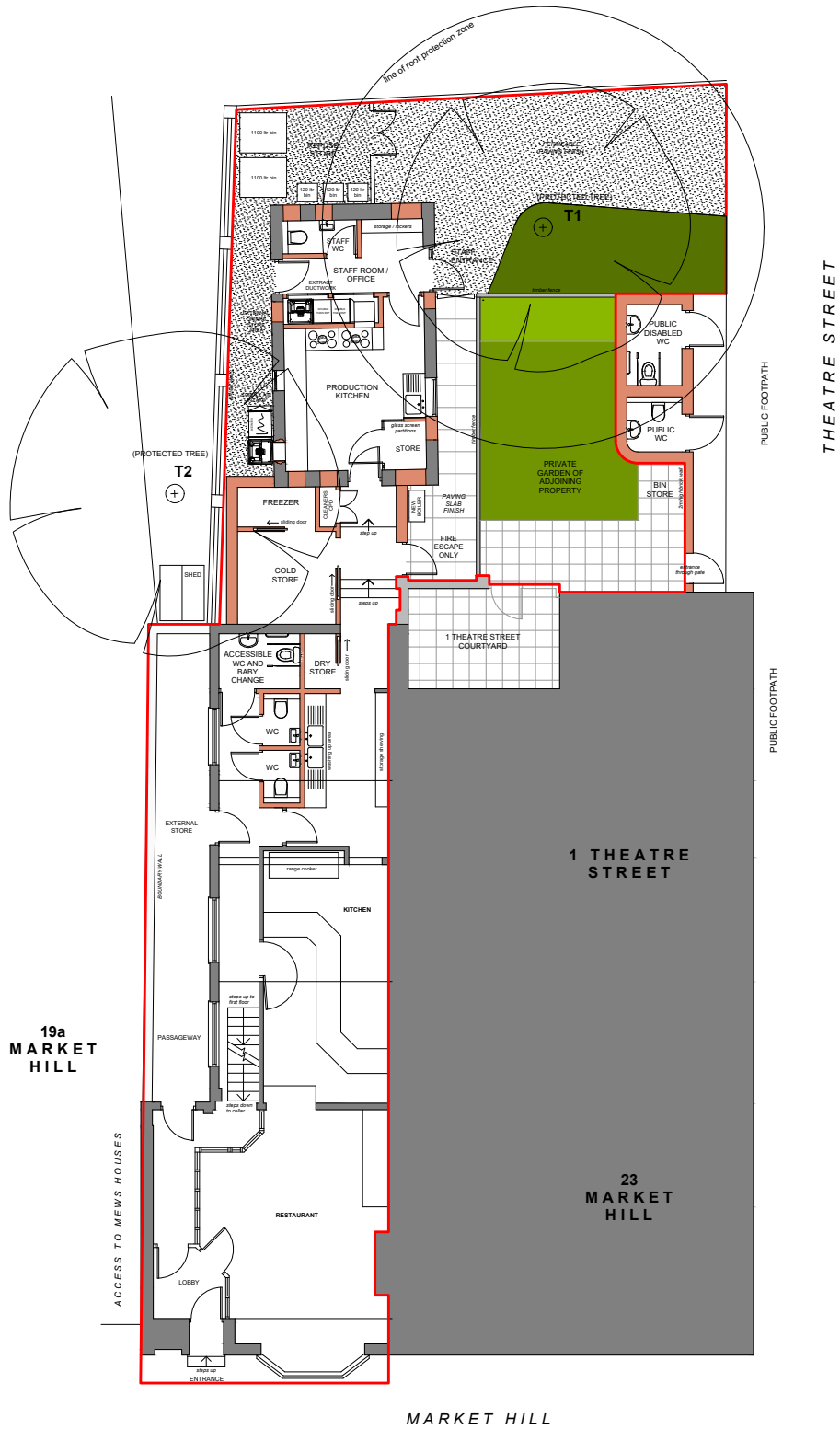
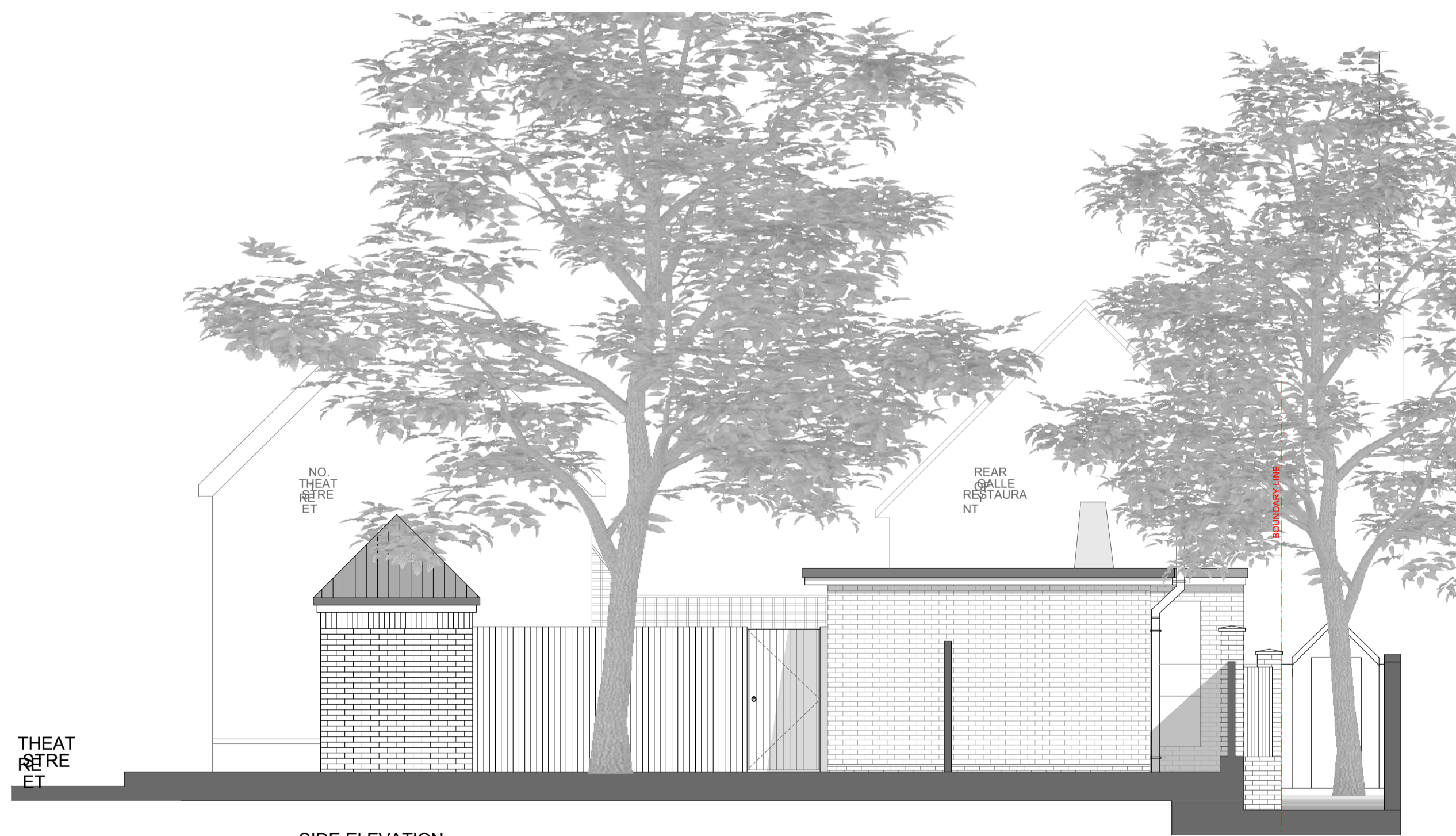


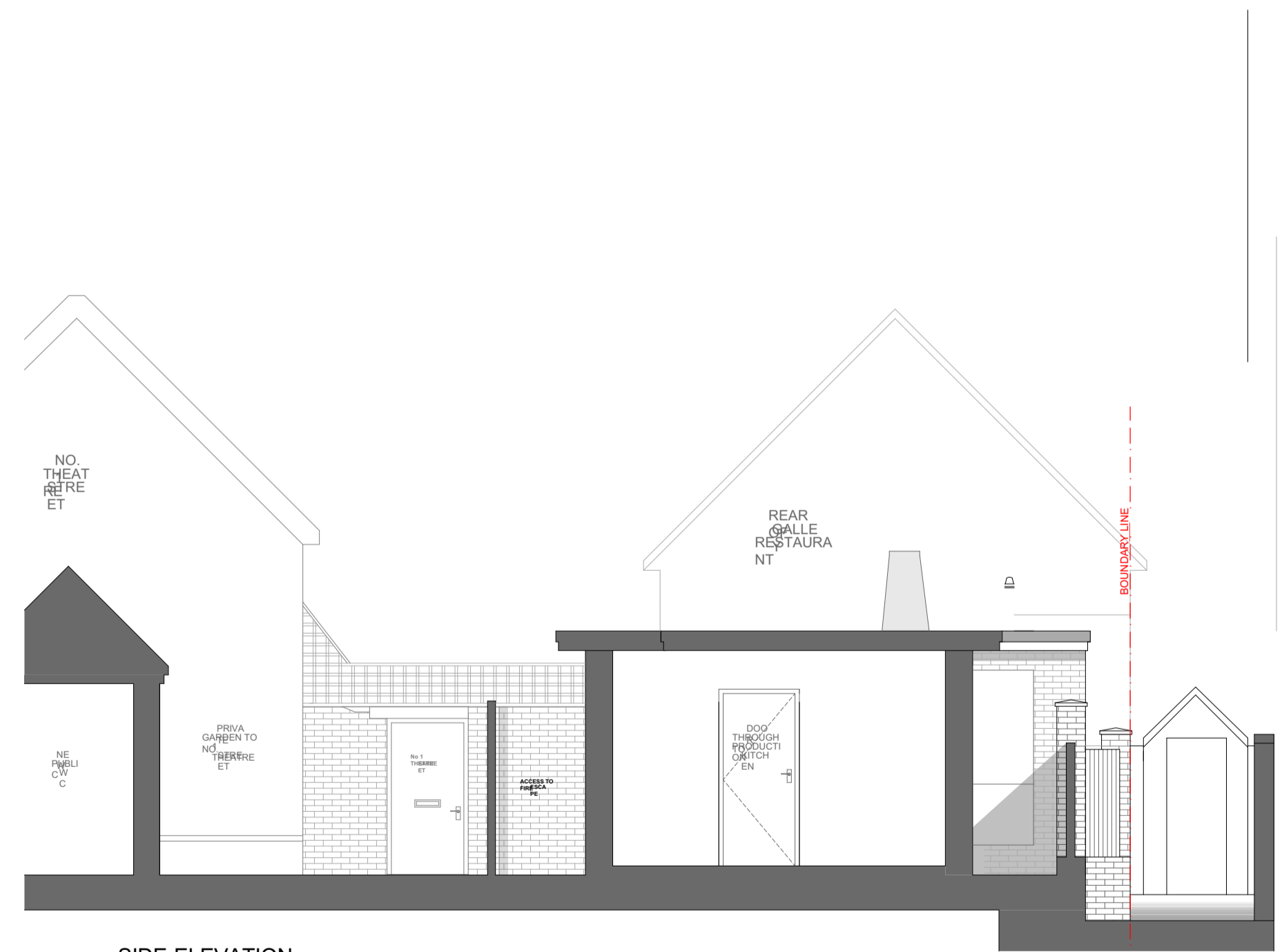
Figure C2 – Proposed development layout with kitchen vent system (CK Direct).



REAR ELEVATION
(FACING REAR OF NEW GALLEY
EXTENSION)



SIDE ELEVATION
(FACING NEW PUBLIC TOILETS AND SIDE OF GALLEY
RESTAURANT EXTENSION)



SIDE ELEVATION
(FACING 1 THEATRE STREET AND SECTION THROUGH GALLEY
RESTAURANT EXTENSION)



Fläkt Woods Limited
 Technical Data Sheet
 ePowerBox AC



Quotation Number :		Project Code :	BO-27505-1
Project Name :		Customer :	
Item Reference: :	Extract Fan	Date:	Tuesday, December 8, 2020

Fan Code	ePowerBox 67-500-1-4 (6HF)
Fan Diameter / Size	500
Velocity	6.6 m/s
Form of Running	B (Horizontal)

Requested Duty (228V)	1.3m ³ /s @ 530 Pa (static)
Control Adjustment	228V
Outlet Dynamic Pressure	25 Pa

Acoustic figures for adjusted running speeds have been interpolated and are for reference only.

Duty Shaft Power	1.32 kW
Max Shaft Power	1.29 kW

This Offer is made subject to the latest version of our A100-19 Terms and Conditions, a copy of which can be made available on request.

Motor Frame	Integral [Class F]
Motor Rating	1.38 kW
Full Load Current	6.22 A
Starting Current	19.9 A
Electrical Supply	220-240 Volts 50 Hz 1 Phase
Start Type	Enquire
Motor Winding	Standard

Regulation 1253/2014	
UVU Efficiency	53.5%
UVU Target Efficiency	44.0%
Nominal Flow Rate	1.61 m ³ /s @ 461 Pa
Effective Input Power	1.38 kW
Nominal RPM	1383 rpm

SFP value	1.02 W/(l/s) @ Requested Duty
Power from mains	1.32 kW
Energy Consumption	3965 kWh (3000 h/year)
Running Cost / Year	£476

Air Density	1.123 kg/m ³ / 40 °C / 0 m / 40% RH
Smoke Venting	Non Smoke Venting
Product Number	BE500003

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	76	77	77	71	68	64	60	56	82	54
Outlet*	74	90	85	77	74	67	63	60	92	61
Breakout*	68	74	64	47	40	29	23	21	76	40

* Lw dB re 10⁻¹² W

** dBA re 2x10⁻⁵ Pa

Sound data at requested duty.

Figure C4 – Proposed Extract Fan Data Sheet.



Fläkt Woods Limited
 Technical Data Sheet
 ePowerBox AC



Quotation Number	:		Project Code	:	BO-27505-2
Project Name	:		Customer	:	
Item Reference:	:	Supply Fan	Date:	:	Tuesday, December 8, 2020

Fan Code	ePowerBox 67-450-1-4 (6FA)
Fan Diameter / Size	450
Velocity	6.9 m/s
Form of Running	B (Horizontal)

Requested Duty (158V)	1.1m ³ /s @ 300 Pa (static)
Control Adjustment	158V
Outlet Dynamic Pressure	27 Pa

Duty Shaft Power	0.715 kW
Max Shaft Power	0.795 kW

Motor Frame	Integral [Class F]
Motor Rating	0.850 kW
Full Load Current	4.1 A
Starting Current	15.58 A
Electrical Supply	220-240 Volts 50 Hz 1 Phase
Start Type	Enquire
Motor Winding	Standard

Regulation 1253/2014	
UVU Efficiency	54.9%
UVU Target Efficiency	41.0%
Nominal Flow Rate	1.16 m ³ /s @ 403 Pa
Effective Input Power	0.850 kW
Nominal RPM	1410 rpm

SFP value	0.65 W/(l/s) @ Requested Duty
Power from mains	0.71 kW
Energy Consumption	2144 kWh (3000 h/year)
Running Cost / Year	£257

Air Density	1.123 kg/m ³ / 40 °C / 0 m / 40% RH
Smoke Venting	Non Smoke Venting
Product Number	BE450022

Acoustic figures for adjusted running speeds have been interpolated and are for reference only.

This Offer is made subject to the latest version of our A100-19 Terms and Conditions, a copy of which can be made available on request.

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	88	67	64	59	56	52	49	47	88	45
Outlet*	95	74	70	66	64	60	52	52	95	52
Breakout*	74	61	52	41	34	30	27	<20	75	31

* Lw dB re 10⁻¹² W ** dBA re 2x10⁻⁵ Pa
 Sound data at requested duty.

Figure C5 – Proposed Supply Fan Data Sheet.



Appendix D: Environmental Survey Summary

The equipment used conforms to BS EN 61672-1:2003 (Class 1) for sound level meters and BS EN 60942 (Class 1) for sound calibrators; with at least traceable calibration history valid; no greater than two years for sound level meters and one year for sound calibrators, relevant to the times of the site assessment.

Manufacturer	Model No.	Description	Serial No.
Larson Davis	LxT (ST)	3 rd octave band sound level meter	2680
Larson Davis	PRMLxT1L	Microphone preamplifier (low range)	29299
Larson Davis	337B02	½" electret microphone	122141
Larson Davis	CAL200	Sound level calibrator	11165

Table D1 – Sound monitoring equipment.

Validation checks at the end of the survey demonstrated acceptable drift across all parts of the study, across the sound level measurement equipment used, of ≤ 0.20 dB. Interval data was recorded at the measurement location at 1-minute and 15-minute periods, time synchronised to GMT.

Weather conditions at the times of site attendance were deemed acceptable for surveying. This was noted to include low wind speeds 2-3 m/s at the measurement location, 40% cloud cover and daytime temperatures of 10 – 13 °C. There was an absence of rain throughout the study and ground conditions were dry.

A brief description of the measurement position has been provided below:

Measurement Position) Located on the south-west boundary of the site on a mast/arm set at approximately 4.5m AGL, 2-3m between the two buildings (The Galley Restaurant and nearest residential receptor). The measurement location was used to determine the underlying sound level climate at the boundary of The Site as close as possible to the nearest residential (first floor) window.

Incident sound was observed predominantly from the existing restaurant plant located within the external storage area. Inlet noise was continuous throughout the measurement period with some compressor noise operating intermittently. These plant operations were explained to be typical while the kitchen was in running (09:30 – 22:00 daily).





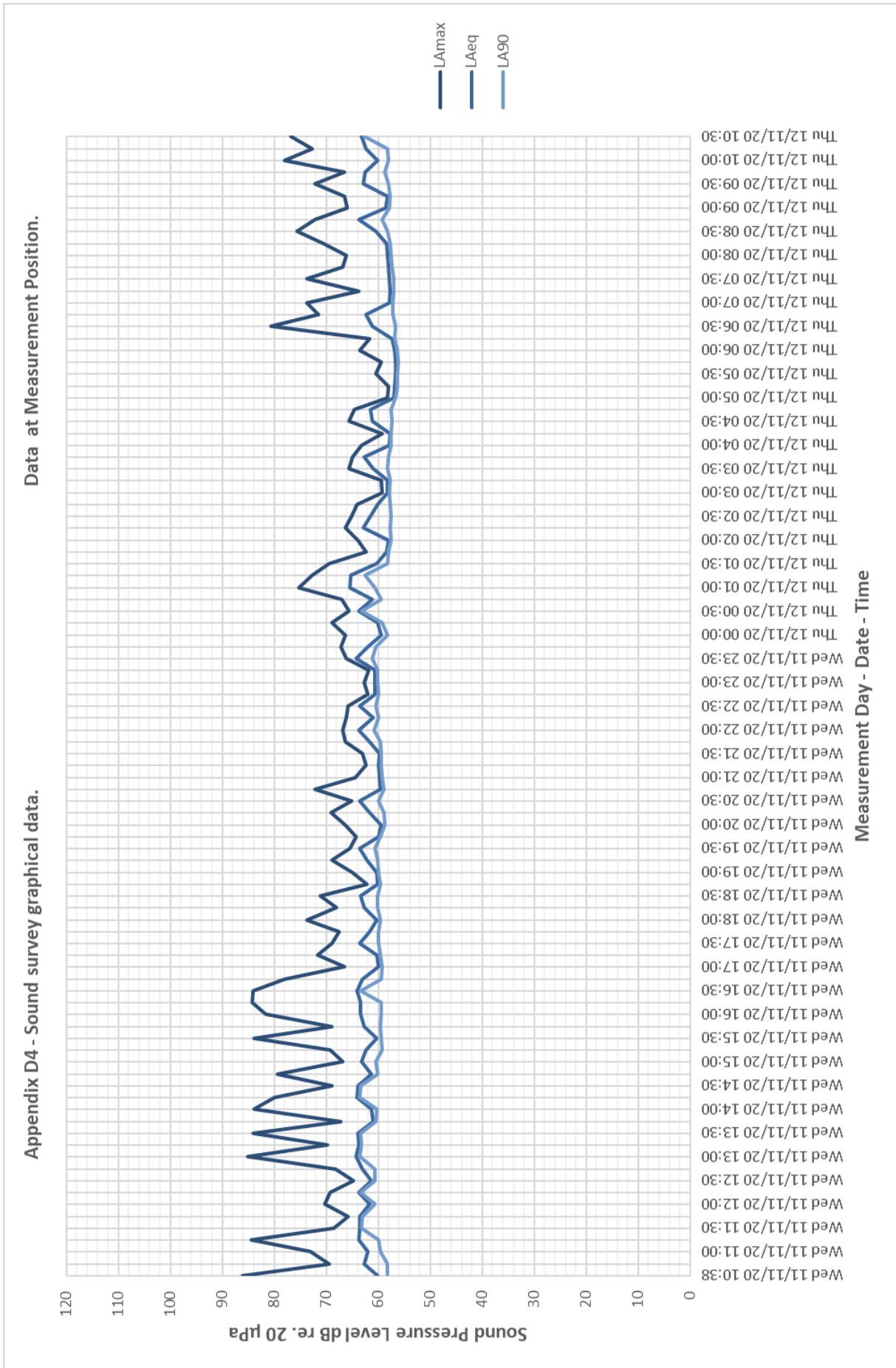
Figure D1 – Photo highlighting Measurement Position.



Figure D2 – Photo highlighting Measurement Position and nearest residential receptor.



Figure D3 – Photo from private footpath facing The Site boundary showing existing kitchen plant located in external storage area (placement of Measurement Position).



Appendix E: Breakout Calculations

Plant Extract Breakout Calculation											
#	Procedure	Data	Octave Band Level dB								Total
			63	125	250	500	1k	2k	4k	8k	
1	Extract Breakout - In duct Sound Power Level	L _w dB	68	74	64	47	40	29	23	21	75
2	Power to pressure over 8 m	L _p dB	-26	-26	-26	-26	-26	-26	-26	-26	-
3	Façade effect	dB	3	3	3	3	3	3	3	3	-
4	A weighting	dB	-26	-16	-9	-3	0	1	1	-1	-
5	Sound Pressure level at 8 m from plant (at receptor)	L _{pA} dB(A)	19	35	32	21	17	7	1	-3	37

Table E1 – Sound breakout from proposed extract system.

Plant Supply Breakout Calculation											
#	Procedure	Data	Octave Band Level dB								Total
			63	125	250	500	1k	2k	4k	8k	
1	Extract Breakout - In duct Sound Power Level	L _w dB	74	61	52	41	34	30	27	20	74
2	Power to pressure over 9 m	L _p dB	-27	-27	-27	-27	-27	-27	-27	-27	-
3	Façade effect	dB	3	3	3	3	3	3	3	3	-
4	A weighting	dB	-26	-16	-9	-3	0	1	1	-1	-
5	Sound Pressure level at 9 m from plant (at receptor)	L _{pA} dB(A)	24	21	19	14	10	7	4	-5	27

Table E2 – Sound breakout from proposed supply system.



Appendix F: Acousticians Qualifications and Status

Dominic Attwell BEng. (Hons) AMIOA

Position Held: Acoustic Consultant.

Qualifications: BSc. (Hons) Audio Acoustics.

Affiliations: Associate Member of the Institute of Acoustics.

Acoustics Experience: 4 years.

Steve Skingle BSc. (Hons) MAES MIOA

Position Held: Principal Acoustic Consultant.

Qualifications: BSc. (Hons) Acoustics.

Institute of Acoustics Diploma in Acoustics and Noise Control.

Affiliations: Corporate Member of the Institute of Acoustics.

Corporate Member of the Audio Engineering Society.

Acoustics Experience: 18 years.





Kitchen Extraction

DESIGN . MANUFACTURE . INSTALL . MAINTAIN



Welcome to

CK Direct

Making a world of difference

CK Direct is an innovator in alternative green technologies; providing sustainable, energy conscious and cost-effective solutions that will make a real difference to the environment.

When the very future of our planet necessitates the need for cleaner air and cleaner water, CK Direct is pioneering solutions to reduce the cost and complexity of bacteria, pathogen and odour control.

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Revolutionising the **cleansing** **and purification** of the air extracted from restaurant kitchens.

A choice of two cooking extraction units for use in restaurants of all sizes.

Significantly reducing the costs and time of in-line filtration maintenance and cleaning.

AirTeck 64gex Slim TRIOXYGEN GENERATOR

AirTeck 10gex TRIOXYGEN GENERATOR

Full CE-ENC accreditation.

Independently approved CE-ENC accreditation:

EN 61000-6-3:2007+A1:2011

EN 61000-6-1:2007

EN 13725 – 2003 Odour Abatement

EN 13824-1 Grease Control



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AirTeck 64gex Slim TRIOXYGEN GENERATOR

The AirTeck 64GEX slim is one of a new generation of high efficiency trioxygen generator units.

- More compact casing
- Separate indicators for each generator, indicating if the generators are working or not
- Higher airflow
- Internal airflow sensor
- External Air Flow Meter-Interlock for trioxygen monitoring if required
- Externally serviceable air-filters.



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AirTeck 10gex TRIOXYGEN GENERATOR

The AirTeck 10GEX trioxygen generator unit, is similar in functionality to the 64gex slim but has been designed for use in smaller establishments.

- More compact casing
- Separate indicator for the generator, indicating if the generator is working or not
- External airflow meter
- External Air Flow Meter-Interlock for trioxygen monitoring if required
- Externally serviceable air-filters.



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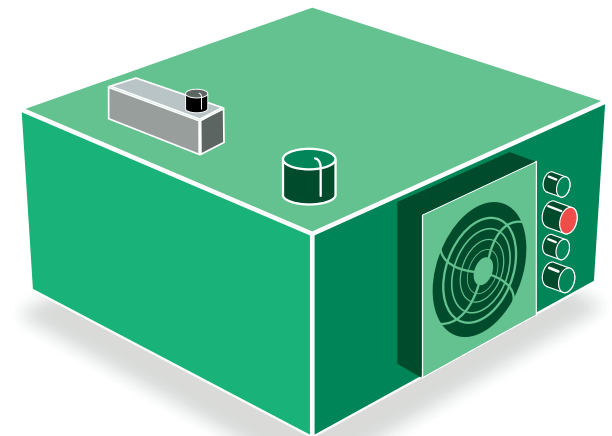
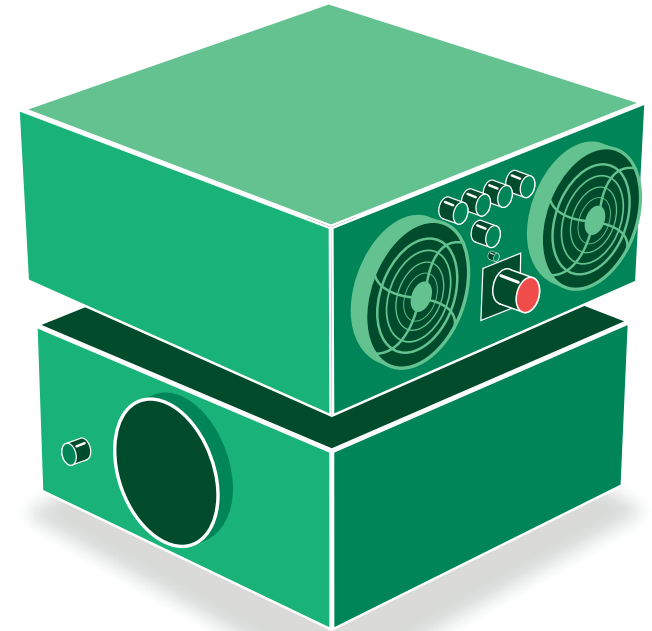
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The clean, green, mean machines

- The unit is quickly and easily installed between the extraction point and the exhaust fan, external to the ductwork
- Makes servicing and maintenance much easier
- The unit produces trioxygen that eliminates odours and grease by oxidising the pathogens in the air flow in the duct work. The unit is installed between the canopy and the fan
- The number of units is dependant on the type of cooking and the airflow. High fat foods typical in Asian cooking /Indian Cooking / Fast Food Burger Joints will need numerous units to combat the high fat levels.



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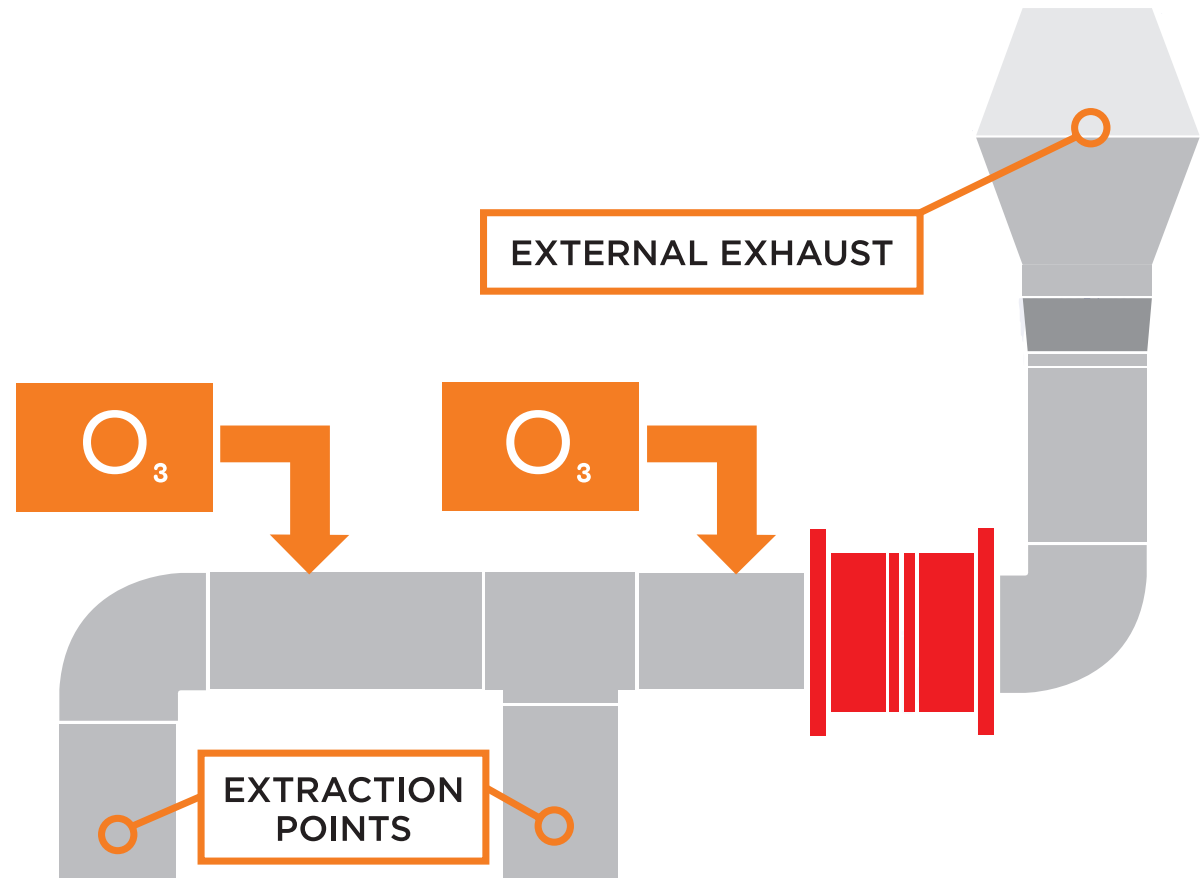
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Typical usage scenario

- Unit is installed external to the extraction duct work
- The trioxygen injection points are connected between the canopy and the fan
- The system has two safety features - an airflow switch and an interlock - the interlock is designed to connect trioxygen monitoring if required
- The airflow switch enables operation only when the fan is in operation.



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What is trioxygen?

At the heart of CK Direct extraction unit technology is the production of trioxygen. The air that we breathe is made up of two oxygen atoms – O_2 , we then add a third oxygen atom to create trioxygen – O_3

- In the environment trioxygen is known as ozone – Mother Nature's greatest cleanser
- The ozone layer protects the earth from harmful sunrays, and the clean, fresh smell you sense after a lightning storm is due to the ozone produced by the lightning
- In essence, we recreate the same effect as lightning to produce trioxygen.



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What makes CK Direct trioxygen extraction units *so much better?*

OUR MUNCHING
MOLECULE

SO SIMPLE

Ready to use instantly without expensive or complicated installation and maintenance

SO CLEAN

Trioxygen is the most powerful oxidiser and steriliser known to man

SO GREEN

Trioxygen is nature's way of cleansing and protecting and is 100% natural and pure

SO COST-EFFECTIVE

Easy to install, clean, service and maintain; the CK Direct trioxygen generators effectively run on air with no expensive chemicals or filtration processes making the whole process incredibly efficient and cost-effective.



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Cleaner, purer kitchen extraction...
there is no comparison!

PRODUCT	AIRTECK 64 SLIM	ESP - 4500	CARBON TWIN BLOCK
COST PER UNIT	£2,699.00 INSTALLED	£5,500.00 INSTALLED	£2,500.00 INSTALLED
SERVICE COSTS	SERVICE COSTS £495.00 FOR 1-3 UNITS PLUS £50 FILTER COST PER UNIT TOTAL £545.00	SERVICE COSTS £3,400.00	SERVICE COSTS £1,600.00
TOTAL COST YEAR 1 CAPITAL & SERVICING	£3,244.00	£8,900.00	£4,100.00
TOTAL SERVICING COST OVER 5 YEARS	£2,725.00	£17,000.00	£8,000.00
TOTAL COST CAPITAL & SERVING OVER 5 YEARS	£5,424.00	£22,500.00	£10,500.00

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The real dangers of chemicals

'THE FIRE service has confirmed the 'chemical incident' in Abingdon that left four people in hospital yesterday was caused by cleaning products.' *June 25, 2019*

- The area was cordoned off after high levels of dangerous gases were identified
- Oxfordshire Fire and Rescue Service described the gases as 'toxic fumes' and said a man fell unconscious after being exposed
- High levels of carbon monoxide and hydrogen sulphide were detected by firefighters
- The fire service stated that a workman who was cleaning the kitchen extract system in a local curry house, passed out when exposed to gases produced from the industrial cleaning chemicals he was using
- Four people were taken to hospital.

Fire station manager Lee Swain warned: 'Mixing cleaning products can generate deadly gases, which can kill.'



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Safety

Trioxigen is a strong oxidiser that is generally not harmful to humans at low concentrations, but is lethal to microorganisms such as bacteria.

Trioxigen, like any other strong oxidising agent, can be harmful if not handled properly. Our website 'trioxigen page' has specific information with guidelines and helpful data on how trioxigen should be handled.



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Call our technical team

ANYTIME

Our products are manufactured and tested to the very highest standards so we are confident that if they are correctly used and maintained as instructed, they will be problem-free.

Whenever possible, machines will be repaired on site but if the machine needs to be taken away for repair, a replacement will be supplied if required.

Any repairs will be carried out to Original Equipment Manufacturer (OEM) standards and the machine returned as promptly as possible.



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Testimonial

'The site had a major issue with another local business who complained about the odours being created by the factory on a daily basis. With no actual odour control system in place, apart from simple HEPA filters; to avoid closure of the plant we had to invest significantly in a new air filtration system that would accommodate the complexities of our style of cooking. Based on market intelligence and information we decided to look at trioxygen, and after numerous meetings and discussion we decide to use the CK Direct cooking odour control trioxygen systems. 12 units were installed in October 2017 and the subsequent issues relating to odour have been completely eradicated. Thanks to CK Direct we have a happy EHO, happy local business partner and an excellent odour control system.'

Iceland Food Processing - Manchester, Supplied by
Nick Stone site engineer & H&S officer



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Sectors

Broadly speaking, CK Direct kitchen extraction falls into three categories, which accordingly define the sectors in which they are most commonly used.



CARE HOMES



HOTELS & RESTAURANTS



UNIVERSITIES & SCHOOLS



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Customers using our technology

The ease of installation, flexibility and scalability of our kitchen extraction units has made them the choice of many leading, respected organisations and well-known high street names.



GORDON RAMSAY RESTAURANTS



HOLMES GROUP



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The Particulate Phase

Our ESP Range



ESP 4500

- ESP 1500E which can handle up to 0.7m³/sec of air flow
- ESP 3000E which can handle up to 1.4m³/sec of air flow
- ESP 4500E which can handle up to 2.1m³/sec of air flow
- ESP 6000E which can handle up to 2.8m³/sec of air flow

Our ESP's have been specifically designed for kitchen extract systems; they have integral sumps to collect the oil, grease and smoke particles filtered out of the exhaust. This not only simplifies servicing but eradicates potentially dangerous spillage from the bottom of the units and greatly cuts down on build-ups of grease within the ducting.

The ionisation voltage has been designed to run at a negative potential which enhances the ionisation of particles and also produces more ozone which is helpful in reducing cooking odours.

Our ESP units fit in-line with the kitchen ducting and can be configured modularly to cope with all extract volume requirements.



KEY FEATURES

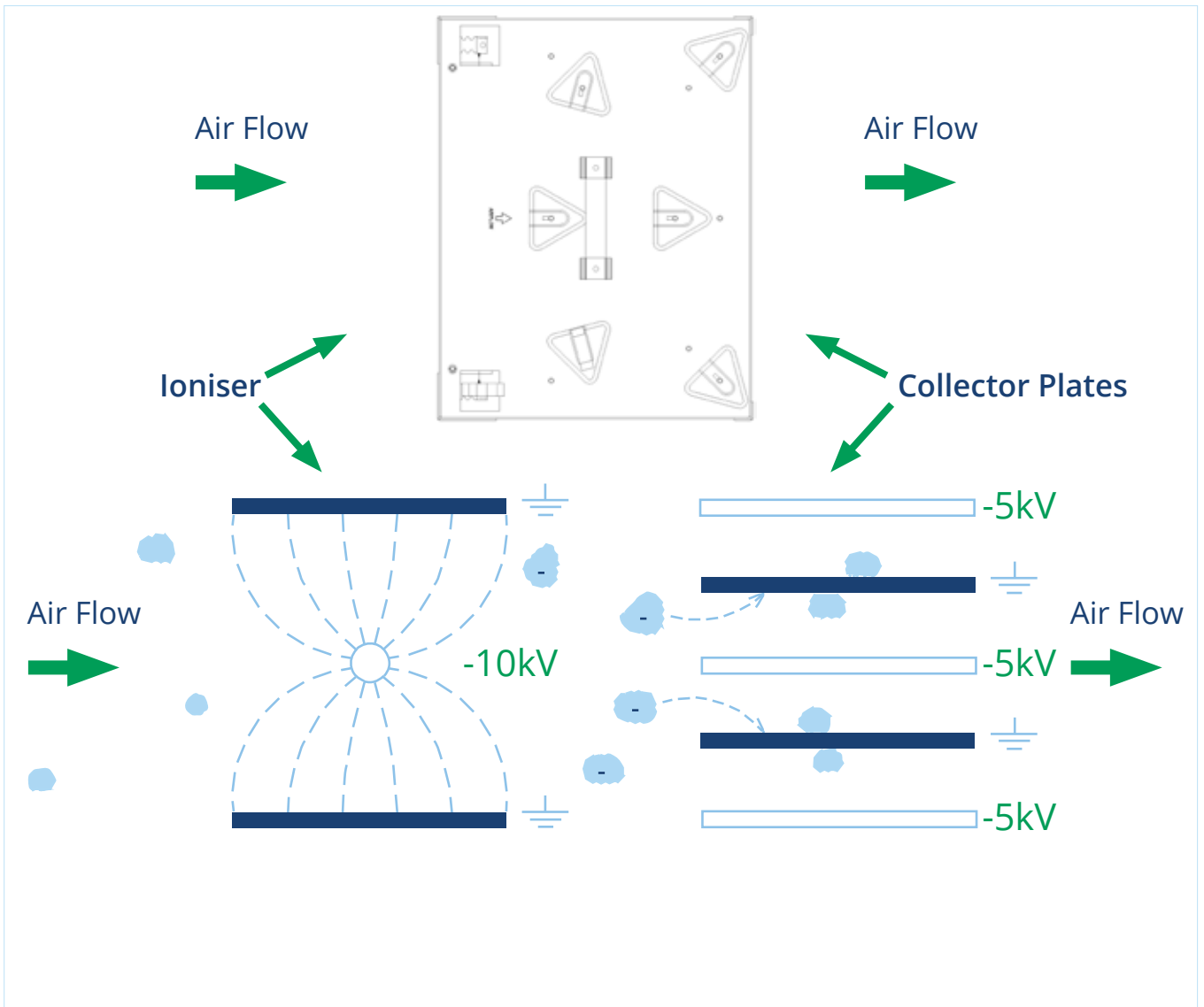
- Eliminates up to 98% of oil, grease and smoke particles
- Filters particles down to sub-micron levels
- Produces Ozone to help reduce malodours
- Designed with an integral sump
- Modular in design
- Specifically designed for commercial kitchen application
- Energy efficient: - uses no more than 50W
- Greatly reduces grease build-up within the duct run

Technical Specification

	ESP 1500E	ESP 3000E	ESP 4500E	ESP 6000E
Electrical Supply	220/240V 50Hz	220/240V 50Hz	220/240V 50Hz	220/240V 50Hz
Power Consumption	20 Watts	30 Watts	40 Watts	50 Watts
Max Air Volume	up to 0.7m ³ /sec	up to 1.4m ³ /sec	up to 2.1m ³ /sec	up to 2.8m ³ /sec
Dimensions W/H/D	450mm/630mm/ 640mm	900mm/630mm/ 640mm	1350mm/630mm/ 640mm	1800mm/630mm/ 640mm
Weight	55Kg	85Kg	118Kg	153Kg



1. Cooking particulates and odours
2. Canopy Grease Filter
3. ESP - Particulate Control Unit
4. Airflow



The above diagram shows, in a basic visual, how an electrostatic precipitator works. As air passes into the combined ioniser / collector cell, the particulates in the air stream are polarised to a negative potential. As they continue through the ioniser and between the collector cell plates, the polarised particulates are repelled away from the negatively charged plates and attracted to the earthed plates where they stick and so are filtered out of the air flow.

An Autowash option can be provided for our entire ESP range.

The autowash nozzle attachment sits inside our standard ESP units. Once connected to the control / wash station the collection cells can be automatically cleaned at regular frequency. The system is usually factory fitted but can also be retro fitted in existing installations, dependant on the generation of units installed.

Daily cleaning keeps the filters working at their optimum efficiency and will greatly reduce the number of service visits required through the year.

For more information please contact our sales team.



3 ESP Units Stacked in modular formation



4 ESP Units Stacked in modular formation with a double pass