



AIRTIGHT & NOISECHECK LIMITED

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BS4142: 2014 (+A1: 2019) TESTING REPORT FOR

GABRIEL MONTENAU
26A ELM GROVE
HAYLING ISLAND
HAMPSHIRE
PO11 9EF

SITE ADDRESS:

PROPOSED TAKE AWAY RESTAURANT
26A ELM GROVE
HAYLING ISLAND
HAMPSHIRE
PO11 9EF

ISSUE DATE: 5TH JUNE 2023

WRITTEN BY: MICHAEL VINE: BSc HONS, MIOA

Acoustic Engineer:

Michael Vine

Test Date: 26th – 27th May 2023



AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Customer Name:

Test Date: 26th – 27th May 2023

Mr Gabriel Montenau
26A Elm Grove
Hayling Island
Hampshire
PO11 9EF

Site Address:

Proposed Takeaway Restaurant
26A Elm Grove
Hayling Island
Hampshire
PO11 9EF

Acoustic Engineer:

Mr. Michael Vine

Equipment used:

Norsonic Environmental Analyser 121 – Serial No 29809 Calibration due July 2024

Norsonic 140 precision sound analyser – serial number 1407126 Calibration due February 2024

Measurement Microphone (Gras 40AF) – Serial No 51465, - Calibration due July 2024 & Nor 1225 – serial number 305215 – Calibration due February 2024

Acoustic Calibrator - (Type 1251) – Serial No 31652, Calibration due March 2024

Measurement Procedure:

The external ambient noise levels were measured for a period of 24hours between Friday 26th & Saturday 27th May 2023 in one microphone location to ascertain the current background noise levels close to the residential window in relation to the proposed extraction system.

In addition to the above, sample measurements were taken at the plant location assessing the installed plant and the neighbouring plant (all in the same location). These levels were measured to indicate the current noise emissions in this location. There is numerous other plant located in the immediate area which is the dominant noise source and each of these were measured as part of this assessment.

All of the units were functioning as usual during the measurement period so both the background noise (BGN) and rating levels of the plant were measured.

The purpose of this report is to ascertain if the newly installed extraction system (serving the approved use as a take away restaurant – planning application number APP/22/00408) will have an adverse impact on the residential dwellings located at the upper floors above the restaurant. Planning permission has already been granted, and this report is to assist discharging conditions 3 & 4.

The extraction motor unit is located inside the ground floor venue and thus will have negligible impact on the residential dwelling above, the ducting runs along the rear elevation of the building, at a distance of 1m from the residential window. The 2 x extraction units (including 1 x motor) for the neighbouring restaurant is located circa 1m to 2m from the window and is the dominant noise source in operation.



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Executive Summary:

Airtight & Noisecheck Ltd were instructed by Gabriel Montenau to undertake a noise assessment at 26A Elm Grove to establish if the proposed extraction system will have an adverse impact on the residential dwellings located at the upper floors of the building. Planning permission has been granted for the change of use, and this report is to assist with releasing conditions 3 & 4. The plant will be located near 2 existing units serving the neighbouring premises.

The plant comprises of the Axial AC YWF4E-450S-P102/60G fan/motor (located internally at ground floor level and comprising of 2 x SURL 500-900 silencers) and a cylindrical duct (450mm) located on the rear flat roof of the building. There are other units also in operation at the site location, with all 3 units listed in the table below.

Unit	Location/Distance	Operation	Audible	Dominant
Extraction system for Chinese Takeaway	Flat roof – 2m from window	Continuous (0830-2300hrs)	Yes	Yes
Extraction Unit for Chip Shop	Flat Roof – 1m from window	Continuous (1145-1400 & 1645-2100)	Yes	Yes
Extraction system for 26A Elm Grove	Flat roof – 1m from window	Continuous (1500-2300hrs)	Perceptible	No

The above is a table with the plant that is apparent at the site, the neighbouring plant is clearly audible above the new plant for 26A Elm Grove and the dominant noise on site. The noise associated with the newly installed extraction system is only faintly audible at the façade when no other plant is in operation and not audible at all when the other plant is in operation. The proposed plant will only ever be on when the neighbouring extraction system is running so it will not be audible at all. During the background noise assessment, the neighbouring plant was switched off at circa 2200hrs which is unusual. This report will include mitigation measures to ensure the proposed plant is not audible even if the neighbouring plant is switched off but this seems excessive and will not be apparent. The noise levels associated with the above plant is shown later in the report. The plant has been compared to the requirements of BS4142: 2014 (+A1: 2019) for the day time and night time period.

This report is to assist with the approved planning application APP/22/00408, and to release the following conditions.

The take-away use hereby permitted shall not be commenced until an acoustic assessment to show that the rating level of any plant & equipment, including extraction systems, condensers, air conditioning plant and so forth, as part of this development, will be at least 5 dB below the existing background levels, has been submitted to and been approved in writing by the Local Planning Authority. The assessment must be carried out by a suitably qualified acoustic consultant / engineer and be in accordance with BS4142: 2014 Methods for rating and assessing industrial and commercial sound.

Such acoustic assessment should also clarify any additional mitigation measures that may be required, to ensure no impact from structure borne and / or air borne noise generated within the proposed hot food take-away



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BS4142: 2014 states that:

- 1- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- 2- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- 3- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific 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.

Based on the measured levels on site, the noise associated with the plant is inaudible at the residential façade when the neighbouring plant is in operation, and the calculations (and on site measurements) indicate that the rating level is -4dB below the BGN at 1400hrs (other plant off) and -10dB below the measured LA90 at 0830hrs (neighbouring plant in operation as early as that) the lowest LA90 value measured so it will not have an adverse impact on the residential dwellings. The plant has been fitted with silencers and is not audible at the residential façade when other plant is running and therefore no further mitigation measures are required to ensure the requirements of BS4142: 2014 (+A1: 2019) are achieved.

All plant were measured directly on site and the rating levels shown in this report. Furthermore, calculations have also been included to show the rating levels of certain plant elements at the residential window.

Condition 4 reads as below:

Equipment shall be installed to suppress and disperse fumes and/or odours produced by cooking and food preparation, and the equipment shall be effectively operated for so long as the use continues. Details of the equipment and any necessary mitigation measures shall be submitted to, and approved in writing by, the Local Planning Authority. The equipment shall be installed and be in full working order to the satisfaction of the Local Planning Authority along with any necessary mitigation measures prior to the commencement of use.

1 Objective:

1.1 The objective of the acoustic procedure is to measure the current background noise levels associated with the current site, to determine if the plant installed will have an adverse impact on the existing dwellings located in close proximity, circa 1m away from the ducting extract. The building is situated within a terrace of mixed-use buildings, and the majority have their own plant (the dominant noise source being the plant associated with the next door take away units) the residential dwellings are located at upper floor levels and face the flat roof area. The plant is located to the rear of the building with all units to be situated on the rear flat roof.

2 Calibration:

2.1 The measurement microphone was calibrated both before and after the testing procedure and no drift was recorded.



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3 Site Layout & Microphone Position:

3.1 The site (26A Elm Grove) is a terraced building located close to the centre of Hayling Island. The building is located immediately to the East of Elm Grove. The immediate area is mixed use with ground floor commercial units and residential above. The dominant noise source is road traffic using the local road network.

3.2 There are 2 x takeaway restaurants located immediately to the North of the site (Royal Chef Chinese Takeaway & Nobbie's Fish & Chips) along with other commercial properties located to the South.

3.3 The plant serving the approved unit has just been installed and the motor is located internally at ground floor level, with only the ducting located on the rear flat roof of the building. The neighbouring units have been in this location for many years, so in fact the BGN levels at the site have been exposed to the other extraction systems located in the immediate vicinity. There are 2 x no units located on the flat roof which are the dominant noise sources apparent, measurements were also taken for these units as part of this assessment.

4 Microphone Location:

4.1 For the background noise levels, the microphone was positioned close to the rear façade of the building as this was the closest façade apparent. Further spot measurements were taken at the existing plant location to achieve exact rating levels for the plant.

4.2 Hours of Operation:

The takeaway restaurant will be open between 1500 -2300hrs every day but closed on Monday. The extraction system will be switched on in line with the extraction systems for the other units. The Chinese takeaway is open between 1700-2300hrs Sunday to Saturday & closed on Monday (same as proposed) and the chip shop is open between 1145-1400hrs & 1645-2100hrs Monday to Saturday and closed on Sunday.

So, it is highly likely that the proposed extraction system will only be on at the same time as the other units and therefore the noise levels will be negligible. There was a period between 2200-2300hrs when the other units were switched off (unusual) and if this is the case, the report will include some suitable mitigation measures that can be installed to the plant.



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6 Description of Testing/Results:

6.1 All plant is currently installed on the flat roof and has been for many years (existing plant). It is located circa 1-2m from the rear façade. The calculated and measured rating level for the roof top unit is 48dBA at 1m. The measured noise levels for the extraction system serving the neighbouring unit are 59dBA at the residential window (2m) and this was the dominant noise source.

6.2 During the attended visit on Tuesday 6th June the neighbouring plant was in operation at 0830hrs operating at 59dBA L_{Aeq} with an L_{A90} of 58dBA, so this indicates that the site is exposed to these levels from a very early time already. Once the proposed plant was also switched on it did not increase the noise levels at all and was not audible at the microphone location.

6.3 The existing unit is clearly audible at the window, and it can be seen that the unit comes on very early during the day time period and this is leading to increased BGN levels during this period, so this will actually lead to higher noise levels throughout the night time period. However, for robustness this report will also include provisions to ensure the ducting will not lead to an adverse impact even if all other plant is not in operation (highly unlikely to be the case). The plant will not be on during the night time period so this report addresses the day time only.

Existing plant status	L_{Aeq} 1hour value – day time	L_{A90} 1hour value – day time	Local Authority Request	Target Value
Off	49dBA	43dBA	-5dB	38dBA
On (modal value between 1500-2300hrs)	62dBA	61dBA	-5dB	56dBA

6.4 It can be seen that the lowest L_{A90} 1hour value during the day time period between 2200-230hrs was 43dBA. The LPA have requested that the new plant be -5dB below the L_{A90} value, therefore the target value for the plant is 38dBA at the window. But it must be stated that the noise levels (measured as part of the 24hour assessment & in isolation on 6th June) clearly show that the current noise levels at the window are actually measured at 59dBA (measured) and 62dBA (modal value between 1500-2300hrs). This indicates that the site is exposed to much higher values than the noise emissions produced by the proposed unit.

6.5 BS4142: 2014 states that:

1- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

2- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

3- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific 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.

6.6 The noise levels associated with all plant were measured on site with the plant being switched on and off for reference values to be taken. The background noise levels were measured for a 24hour period to encapsulate the night time period. The table below shows the rating levels of the other plant apparent on the roof top (all values taken at the residential window)

Plant Unit	Location	L_{Aeq} Value	L_{A90} Value
Neighbouring extraction system	1m	59.5dBA	58.4dBA
Proposed Extraction	1m	48dBA	47.3dBA
Both extraction systems in operation	1m	59.5dBA	58.5dBA

6.7 It can be seen that the replacement extraction system does not increase the noise levels at the residential window when the other extraction system is in operation. The rating level (measured on site) of the unit is shown on the following page, but it is not audible at the façade when other plant is in operation. It will not be in operation during times when the neighbouring unit is not in operation.



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Rating Levels – with other plant in operation – compared to measured LA90 6/6/2023:

Results

Commentary

Ambient Sound Level	Sound Pressure Level = 48dBA @1m	Measured source level (no AFC)
Residual Sound Level	54dBA	Measured at receptor – LAeq during opening hours – with neighbouring plant not in operation
Specific Sound Level	48dB	
Acoustic Feature Correction	None	Continuous and not audible
Reductions due to distance	None	$L2 - L1 - 20 \log (r2/r1)$
Rating Level	48dBA	Plant level at façade
Background Sound level	58dBA	Measured on site – with plant on
Excess of rating over background	$(48-58) = -10\text{dB}$	
Assessment indicates no adverse impact at receptor – inaudible at façade		

The above table indicates the level of the replacement plant when the other plant is in operation. This will be the case all of the time as the neighbouring plant is always on at the same time.

Day Time – New Plant only – to lowest BGN value:

Results

Commentary

Ambient Sound Level	Sound Pressure Level = 48dBA	Plant measured at 1m
Residual Sound Level	49-54dBA	Measured at receptor
Specific Sound Level	48dBA	
Acoustic Feature Correction	0	Continuous
Reductions due to distance	None	$L2 - L1 - 20 \log (r2/r1)$ 1m to 7m
Rating Level	48dBA	Plant level at façade
Background Sound level	38dBA	Measured on site (incl -5dB from LPA)
Excess of rating over background	$(48-38) = +10\text{dB}$	
Assessment indicates no adverse impact at receptor – inaudible at façade		This must be taken into context; it is clear to see that the site is exposed to levels in excess of 58dBA from 0830hrs so these levels will not have an adverse impact

Day Time – New Plant only – to lowest BGN value with mitigation:

Results

Commentary

Ambient Sound Level	Sound Pressure Level = 48dBA	Plant measured at 1m
Residual Sound Level	49-54dBA	Measured at receptor
Specific Sound Level	48dBA	
Acoustic Feature Correction	0	Continuous
Reductions due to mitigation	Minimum of -10dB	Siderise DWX Acoustic Barrier or Muftilag Duct Wrap
Rating Level	38dBA	Plant level at façade
Background Sound level	38dBA	Measured on site (incl -5dB from LPA)
Excess of rating over background	$(38-38) = 0\text{dB}$	Meets the -5dB rating by LPA
Assessment indicates no adverse impact at receptor – inaudible at façade		Mitigation will meet the req of the LPA if other plant off (highly unlikely)



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Rating Levels – with other plant in operation – compared to measured modal LA₉₀ 26/5/2023:

Results

Commentary

Ambient Sound Level	Sound Pressure Level = 48dBA @1m	Measured source level (no AFC)
Residual Sound Level	62dBA	Measured at receptor – Modal LA _{eq} between 1500-2300hrs (operating hours)
Specific Sound Level	48dB	
Acoustic Feature Correction	None	Continuous and not audible
Reductions due to distance	None	L2 – L1 -20log (r2/r1)
Rating Level	48dBA	Plant level at façade
Background Sound level	61dBA	Measured on site – with plant on – modal LA ₉₀ 1500-2300hrs
Excess of rating over background	(48-61) = -13dB	
Assessment indicates no adverse impact at receptor – inaudible at façade		Plant is not audible when other plant is in operation

The above table indicates the level of the replacement plant when the other plant is in operation. This will be the case all of the time as the neighbouring plant is always on at the same time.

7 Results Conclusion:

7.1 The results table indicate that the proposed plant will not lead to an adverse impact during the day time period for the residential dwellings with the neighbouring plant in operation. The plant is not audible at the residential façade as it is located circa 1m away and not audible if the neighbouring plant is in operation. Even in isolation, it should not lead to an adverse impact. The dwellings are exposed to noise levels comprising of road traffic noise and other commercial uses. The installation of the plant will be negligible at the residential façade. However, this report has included possible mitigation measures that can be installed to the ducting to reduce the noise further.

7.2 The other noise sources apparent at the residential façade were road traffic (circa 55dBA), the neighbouring plant (56dBA – rising to circa 60-63dBA depending on capacity within restaurant). So, the noise associated with the proposed plant will not lead to an adverse impact and is not a dominant noise source. This is clear to see during a site visit with the noise source in operation.

7.3 The new motor is located internally with 2 x silencers that have already been installed. The fan unit is an Axial AC fans YWF4E-450S-P102/60G with 2 x SURL 500-900 silencers that have already been installed.

7.4 It is also clear to see from the data that the neighbouring plant is dominant and depending on how busy they are the fan noise will increase due to the fan being turned up to cope with the workload. In addition to this, the neighbouring unit comes on at circa 0830hrs with noise levels exceeding 59dBA so it is clear that the site is exposed to high noise levels currently and the proposed unit will not be audible with the other plant in operation. Also, even with no further mitigation measures installed the proposed unit is a lot quieter than the current acoustic environment apparent at the site location due to the current noise sources (road traffic & other plant)



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7.5 The termination point for the ducting extraction system is 1.5m above the building roof line and therefore the ducting terminates into the free field atmosphere. With this in mind it is clear that the proposed extraction unit will not lead to odour issues at the residential window. The client has installed PA-242412-7C carbon filters to the system to reduce the odour and emissions further. They have also taken steps to ensure this is not the case and that they comply with Policy CS16 High Quality Design and Policy DM10 Pollution. The steps taken by the client are expressed in the correspondence below.

7.6 The ducting had not been installed at the initial time of writing the report, so a calculation-based assessment was also undertaken using data taken on site (fan motor was installed). These calculations are included in the raw data section. They indicate a combined level of 48.8dBA at the residential façade. This is almost exactly the same as the measured values on site once the ducting had been included. It is anticipated that the actual level is 48dBA rather than 48.8dBA due to the discharge termination point being screened from the window by the roof line, this will only make a negligible impact and for this reason a level of 48dBA is an accurate assessment of the plant. This value was obviously measured on site so it can be backed up and substantiated, but the calculations also indicate this rating level at the residential window.

7.7 The proposed mitigation measures for the plant are an acoustic duct wrap, similar to the links shown below. This will ensure the plant is at least -5dB below the lowest LA90 value (with no other plant in operation) but this seems to be excessive as the neighbouring plant is clearly the dominant noise source apparent at the site, on from as early as 0830hrs and will always be in operation when the new units will be in operation, so in fact the mitigation measures may not be needed, but they have been included for robustness to ensure the requirements of the LPA can be achieved.

chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.siderise.com/App_Data/product-information/SIDERISE%20DWX%20Ducting%20Acoustic%20Barrier.pdf

<http://www.muftilag.com/muftilag%C2%AE-original/>



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Policy CS16 High Quality Design

Planning permission will be granted for development that is designed to a high standard, which helps to create places where people want to live, work, and relax. All development should demonstrate that its design:

1. Responds to, draws inspiration from and respects local context and:

a) Identifies and responds positively to existing features of natural, historic, or local character within or close to the proposed development site.

b) Integrates with existing local landscape features, promotes wildlife and biodiversity and/or applies characteristics of the local area into the design of a scheme wherever possible to create variety and interest;

c) Uses the characteristics of the locality to help inform the design of the new development including heights, massing, existing buildings lines, plot widths and depths, materials, and proportions of windows and doors.

d) Is well connected to and integrates with the immediate local area and the wider area by linking to existing pedestrian and cycle routes and encouraging people to use public transport where possible; and

e) The development does not cause unacceptable harm to the amenity of neighbours through smell, the loss of privacy, outlook, noise and overlooking.

2. Produces a positive relationship between buildings, street, and spaces both existing and proposed, where:

a) The layout of the development reduces opportunities for crime and antisocial behaviour; contributes to improving community safety; and makes provision for the management and maintenance of the development

b) New streets are not dominated by vehicular traffic;

c) The layout of the development is legible, meaning it is easy to orientate oneself and move through.

3. Contributes to the improvement of the public realm close to the development, particularly sites close to town, district and local centres and other priority regeneration areas by using high quality hard and soft landscape material and street furniture; and where development is of a significant scale or prominence makes provision for public art.

4. Is inclusive by considering the needs of those with disabilities, ensuring safe and convenient access for all; and integrating affordable and supported housing with market housing through tenure blind design to minimise social exclusion and promote social integration.

5. Maximises opportunities for mixed use developments, particularly in town and district centres; and encourage higher densities (50+ dwellings per hectare) where appropriate.

6. Mitigates negative environmental impacts through sustainable design and construction methods, resource efficiencies, particularly water and the provision of facilities for waste recycling.

7. Adapts to the changing needs of the users and the changing climate over the lifespan of the building.



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Addressing the policy CS16

1a. No modifications have been done to the outside front of the property apart from the name street sign applied to conserve the historical aspect of the place. At the rear of the property will be applied the ducting leading above the roofing line to address next parts of the policies. (For visual information check the plan)

1b. The ducting applied at the rear of the property will be capped (Chinese stile ducting hat) with a mesh grill so it will not impact with the wild life. That will prevent any birds from entering the extraction system. (For visual information check the plan)

1c. The ducting is going to be placed at the rear of the property so it will not impact any building lines, masses, obstruct windows, go above total height of the building. (For visual information check the plan)

1d. Has no impact on pedestrian, cycle routes or public transport due to the fact that is at the rear of the property

1e. The ducting will be secured to the buildings wall with rubber bushings to absorb vibrations not obstructing any entrances, windows and will not create privacy issues as seen in the plans. Noise will be addressed with two silencers one just after the motor and one just outside of the flat roof. 2 x Silencer used in the project will be SURL 500-900. These silencers are built up to spec and distributed by an authorised company in the UK. The odour is addressed by a carbon filter. These filters are manufactured for ease of installation and incorporation into ducted air systems.

They can be used on both supply for purifying incoming air and can be used on the extract to remove toxic gasses and odours generated within a process. Model used as part of this system is PA-242412-7C. This will mitigate any gases or smells coming out of the extraction system. Height of the extraction system will be a total of 3.73 Meters going above the window as required by law with 1.3m.

2. The extraction system has no impact on this point

3. The extraction system mitigated in this application has no impact on sites close to town, district and local centres and other priority regeneration areas.

4. The extraction system mitigated in this application has no impact on those with disabilities, ensuring safe and convenient access for all.

5. The extraction system mitigated in this application has no impact on mixed use developments

6. The extraction system mitigates native environmental impacts through sustainable design and construction methods.

7. The ducting system has been designed to exceed all user needs so will not need adaptations and extensions . all components of the extraction system are accessible for servicing and repairs.



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DM10 Pollution

Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation, and other pollutants will only be permitted where all of the following relevant criteria can be met:

1. The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk.
2. National air quality standards or objectives would not be breached.
3. The water environment would not be detrimentally affected.
4. It would not lead to an unacceptable deterioration in the quality or potential yield of coastal, surface and ground water resources.
5. External lighting is of the minimum level of illumination and duration required for security and operational purposes.
6. External lighting would not interfere with safe navigation in either Chichester or Langstone Harbours and other coastal locations.

Addressing the policy DM10

The development components have been selected so they will not cause water air and soil pollution. All components, their details and how they address any issues in the policy DM10 are listed below.

The extraction system is composed out of the following parts and addressing the following issues. Extraction Canopy Made out of stainless steel (extracts all gases fumes and smells generated by grill hob and frier from the kitchen area and the size is 3.6 meters by 1.1 meters exceeding the total size of the appliances combined of 3m by 0.9 meters). Stainless steel ensures that there are no contaminants to food air smell and water or land.

Ducting 90° corner made out of galvanised steel that ensures low impact on environment easy to maintain, inspect and repair. Carbon air Filter in galvanised steel enclosure. The modules are manufactured by mounting a series of panel filters within a sealed case. The airflow is optimized by presenting the filtering surfaces in a "V" formation. Each panel is sealed into the filter case so as to ensure no air can bypass the bonded granules. The panels are manufactured using long established bonding techniques which hold the granules in a rigid biscuit. The biscuit is encapsulated in a carbon impregnated cloth which prevents any leakage of granules or powder. The unique bonding method used by Purified Air ensures that the panels will remain intact and rigid even if wet. The model of the filter installed is PA-242412-7C.

Extraction motor: the model is Axial AC fan YWF4E-450S-P102/60G. This motor ensures a flow of 5050 M3/h and uses 220v to 240 v single phase at 1.2A power. The motor ensures the flow of air thru the ventilation system by pulling all the smokes odours and vapours thru the carbon filter in to the ducting.

2 x Silencers installed: The model is S1RL 500-900 and ensures that the noise caused by the air circulating the extraction system and the noise produced by the extraction motor. The silencer has been recommended by the manufacturing company after examining the datasheet from the motor to maximise the sound attenuation.

Ducting: made out of galvanised steel that ensures low impact on environment easy to maintain, inspect and repair.



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All ducting will be fixed on the outside wall at the back of the building to eliminate any visual discrepancies to the surrounding area with brackets and rubber insulation plus rubber bushings as fittings in to the wall to minimise vibrations and frequency noise as to eliminate any noise nuisance caused to surroundings. A Chinese style hat with mesh made out of galvanised steel to ensure the proper dispersion of air coming out of the extraction system and also ensure the protection of wild life by preventing them from entering the extraction system.

1. To ensure the safety on any users on and off the site the filter , motor and silencer will be fitted inside the building enclosed, and sound insulated so the access to any of them will be made after removing a protective cover. The ducting to the outside of the building will be installed out of reach on the external wall . The outside wall where the ducting is going to be installed has no access windows next to it and that makes it out of reach for anyone.
2. National air quality will be addressed by the carbon air filters that have been implemented in the system and as specified in the data sheet provided will not be breached
3. The extraction system has no impact on the water environment due to galvanised steel used.
4. Due to the galvanised steel used for the ducting no unacceptable deterioration will happen and we will make sure that every 6 months we will inspect and do all repairs needed
5. There is no exterior lightning attached to the extraction system.
6. There is no exterior lightning attached to the extraction system.

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8 Google Earth Image:





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APPENDIX

Continuous equivalent noise level, LAeq — The steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

LAmx - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) — A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room — A room used for sleeping or recreation/relaxation.

LA90 - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

BS4142: Methods for rating and assessing industrial and commercial sound.

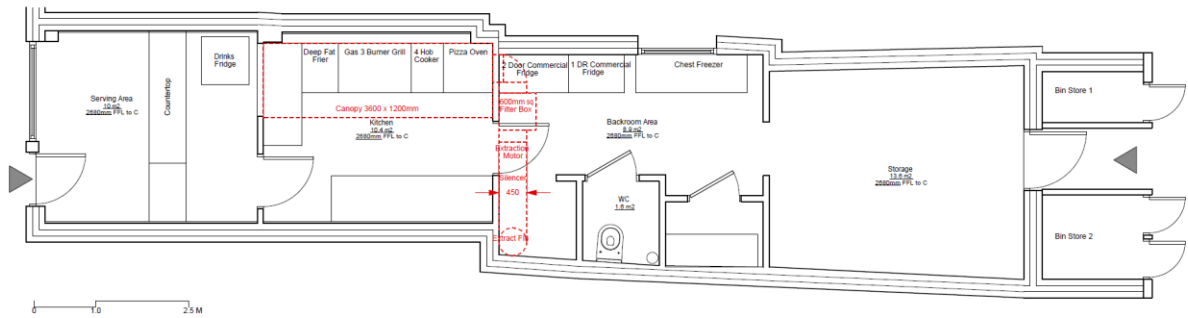
$L_2 = L_1 - 20\log(r_2/r_1)$ — Point source equation

$10\log(\text{duration of event}/\text{duration of reference period})$

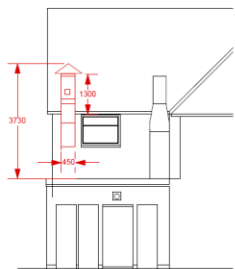


AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING

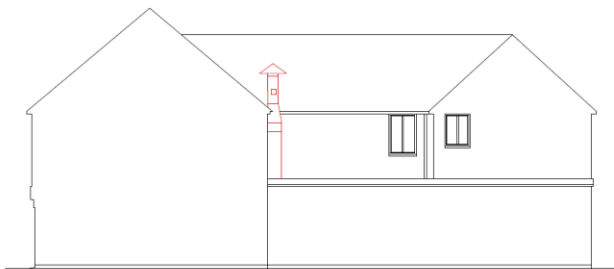
SITE PLAN



4 Scale: 1:50
Ground Floor Plan (Proposed)



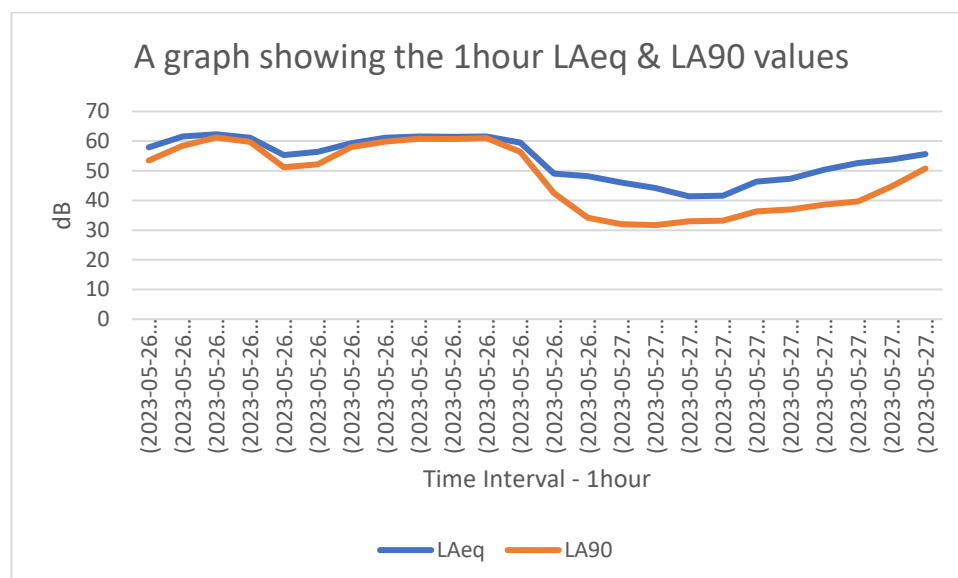
7 East Elevation (Existing & Proposed)
Scale: 1:100



8 South Elevation (Existing & Proposed)
Scale: 1:100

Raw Data – Measured at Site – 1hour data.

Time:	LAeq	LA90
(2023-05-26 10:01:00.220)	57.9	53.5
(2023-05-26 11:01:00.220)	61.6	58.4
(2023-05-26 12:01:00.220)	62.3	61.2
(2023-05-26 13:01:00.220)	61.1	59.7
(2023-05-26 14:01:00.220)	55.3	51.2
(2023-05-26 15:01:00.220)	56.4	52.2
(2023-05-26 16:01:00.220)	59.3	58
(2023-05-26 17:01:00.220)	61.1	59.8
(2023-05-26 18:01:00.220)	61.6	60.8
(2023-05-26 19:01:00.220)	61.4	60.7
(2023-05-26 20:01:00.220)	61.6	61
(2023-05-26 21:01:00.220)	59.5	56.4
(2023-05-26 22:01:00.220)	49.1	42.5
(2023-05-26 23:01:00.220)	48.2	34.2
(2023-05-27 00:01:00.220)	46	32
(2023-05-27 01:01:00.220)	44.2	31.7
(2023-05-27 02:01:00.220)	41.4	33
(2023-05-27 03:01:00.220)	41.6	33.2
(2023-05-27 04:01:00.220)	46.3	36.3
(2023-05-27 05:01:00.220)	47.3	37
(2023-05-27 06:01:00.220)	50.3	38.6
(2023-05-27 07:01:00.220)	52.6	39.7
(2023-05-27 08:01:00.220)	53.8	44.7
(2023-05-27 09:01:00.220)	55.6	50.8





Time:	LAeq	LA90
(2023-05-26 10:01:00.220)	54.8	52.1
(2023-05-26 10:04:00.220)	55.5	52.3
(2023-05-26 10:07:00.220)	54.9	52.3
(2023-05-26 10:10:00.220)	54.7	52.3
(2023-05-26 10:13:00.220)	54.7	52
(2023-05-26 10:16:00.220)	54.7	51.6
(2023-05-26 10:19:00.220)	59	57.9
(2023-05-26 10:22:00.220)	59.5	57.8
(2023-05-26 10:25:00.220)	59.5	58
(2023-05-26 10:28:00.220)	58.9	57.7
(2023-05-26 10:31:00.220)	59	57.7
(2023-05-26 10:34:00.220)	58.6	57.8
(2023-05-26 10:37:00.220)	59.3	58.3
(2023-05-26 10:40:00.220)	58.7	57.9
(2023-05-26 10:43:00.220)	58.4	57.7
(2023-05-26 10:46:00.220)	58.4	57.4
(2023-05-26 10:49:00.220)	58.3	57.4
(2023-05-26 10:52:00.220)	58.2	57.5
(2023-05-26 10:55:00.220)	58.4	57.5
(2023-05-26 10:58:00.220)	58.6	57.7
(2023-05-26 11:01:00.220)	58.6	57.6
(2023-05-26 11:04:00.220)	58.5	57.5
(2023-05-26 11:07:00.220)	59.2	57.6
(2023-05-26 11:10:00.220)	59.1	58.1
(2023-05-26 11:13:00.220)	59.2	58.3
(2023-05-26 11:16:00.220)	61.9	60.2
(2023-05-26 11:19:00.220)	62.2	61.2
(2023-05-26 11:22:00.220)	62.1	61.3
(2023-05-26 11:25:00.220)	61.9	61.3
(2023-05-26 11:28:00.220)	62	61
(2023-05-26 11:31:00.220)	61.8	61.3
(2023-05-26 11:34:00.220)	61.9	61.4
(2023-05-26 11:37:00.220)	61.9	61.4
(2023-05-26 11:40:00.220)	62.6	61.5
(2023-05-26 11:43:00.220)	62.2	61.5
(2023-05-26 11:46:00.220)	62.5	62
(2023-05-26 11:49:00.220)	62.5	62
(2023-05-26 11:52:00.220)	62.5	62
(2023-05-26 11:55:00.220)	62.2	61.8
(2023-05-26 11:58:00.220)	62.2	61.7
(2023-05-26 12:01:00.220)	62.3	61.7
(2023-05-26 12:04:00.220)	62.4	61.9
(2023-05-26 12:07:00.220)	62.3	61.8
(2023-05-26 12:10:00.220)	62.4	61.8



(2023-05-26 12:13:00.220)	62.7	61.8
(2023-05-26 12:16:00.220)	62.3	61.8
(2023-05-26 12:19:00.220)	62.4	61.9
(2023-05-26 12:22:00.220)	62.7	62.3
(2023-05-26 12:25:00.220)	62.4	62
(2023-05-26 12:28:00.220)	62.8	62
(2023-05-26 12:31:00.220)	62.9	62.3
(2023-05-26 12:34:00.220)	62.6	62.1
(2023-05-26 12:37:00.220)	62.6	62.1
(2023-05-26 12:40:00.220)	62.6	62.2
(2023-05-26 12:43:00.220)	62.6	62.2
(2023-05-26 12:46:00.220)	62.4	61.3
(2023-05-26 12:49:00.220)	61.5	60.8
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(2023-05-26 13:07:00.220)	61.5	60.9
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(2023-05-26 13:37:00.220)	61.7	61.1
(2023-05-26 13:40:00.220)	61.8	61
(2023-05-26 13:43:00.220)	61.1	60
(2023-05-26 13:46:00.220)	58.2	52
(2023-05-26 13:49:00.220)	60	59.3
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(2023-05-26 14:01:00.220)	57.8	52.6
(2023-05-26 14:04:00.220)	58.5	54.6
(2023-05-26 14:07:00.220)	57.4	54.5
(2023-05-26 14:10:00.220)	54	51.2
(2023-05-26 14:13:00.220)	55.5	50.6
(2023-05-26 14:16:00.220)	53.8	50.8
(2023-05-26 14:19:00.220)	53.9	51.1
(2023-05-26 14:22:00.220)	53.1	50.2
(2023-05-26 14:25:00.220)	53.8	50.8



(2023-05-26 14:28:00.220)	54.8	50.7
(2023-05-26 14:31:00.220)	53.8	51.5
(2023-05-26 14:34:00.220)	55.2	52.5
(2023-05-26 14:37:00.220)	55.7	52.4
(2023-05-26 14:40:00.220)	56	51.5
(2023-05-26 14:43:00.220)	56.9	51
(2023-05-26 14:46:00.220)	54.2	50.8
(2023-05-26 14:49:00.220)	52.9	50.4
(2023-05-26 14:52:00.220)	54.4	51.8
(2023-05-26 14:55:00.220)	54	50.4
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(2023-05-26 15:01:00.220)	53.1	50.6
(2023-05-26 15:04:00.220)	54	51.5
(2023-05-26 15:07:00.220)	54.6	52.7
(2023-05-26 15:10:00.220)	54.7	51.9
(2023-05-26 15:13:00.220)	55	52.8
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(2023-05-26 15:25:00.220)	54.8	51.8
(2023-05-26 15:28:00.220)	54.5	51.2
(2023-05-26 15:31:00.220)	54.9	51
(2023-05-26 15:34:00.220)	57.4	51.6
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(2023-05-26 15:40:00.220)	58.1	57.3
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(2023-05-26 15:46:00.220)	58.1	57.1
(2023-05-26 15:49:00.220)	58.2	57.2
(2023-05-26 15:52:00.220)	58.1	57.3
(2023-05-26 15:55:00.220)	58.3	57.3
(2023-05-26 15:58:00.220)	58.6	57.3
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(2023-05-26 16:07:00.220)	58.4	57.4
(2023-05-26 16:10:00.220)	57.5	52.8
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(2023-05-26 16:22:00.220)	58.9	58.3
(2023-05-26 16:25:00.220)	59.1	58.2
(2023-05-26 16:28:00.220)	59.7	58.8
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(2023-05-26 16:37:00.220)	59.4	58.6
(2023-05-26 16:40:00.220)	59.2	58.4



(2023-05-26 16:43:00.220)	59	58.2
(2023-05-26 16:46:00.220)	59	58.2
(2023-05-26 16:49:00.220)	59.3	58.3
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(2023-05-26 16:55:00.220)	61.2	60
(2023-05-26 16:58:00.220)	60.9	60.3
(2023-05-26 17:01:00.220)	61.2	60.5
(2023-05-26 17:04:00.220)	61.7	60.6
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(2023-05-26 17:10:00.220)	61.3	60.5
(2023-05-26 17:13:00.220)	61	60.4
(2023-05-26 17:16:00.220)	60.8	59.7
(2023-05-26 17:19:00.220)	61.5	60.8
(2023-05-26 17:22:00.220)	61.6	60.8
(2023-05-26 17:25:00.220)	60.2	59.4
(2023-05-26 17:28:00.220)	60.1	59.4
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(2023-05-26 17:34:00.220)	60.3	59.5
(2023-05-26 17:37:00.220)	60.5	59.4
(2023-05-26 17:40:00.220)	61.3	59.8
(2023-05-26 17:43:00.220)	61.6	61
(2023-05-26 17:46:00.220)	61.2	60.4
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(2023-05-26 17:52:00.220)	60.9	60
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(2023-05-26 18:01:00.220)	61.5	60.9
(2023-05-26 18:04:00.220)	61.3	60.6
(2023-05-26 18:07:00.220)	61.6	60.8
(2023-05-26 18:10:00.220)	61.3	60.6
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(2023-05-26 18:31:00.220)	62.2	61.5
(2023-05-26 18:34:00.220)	62.2	61.6
(2023-05-26 18:37:00.220)	61.8	60.9
(2023-05-26 18:40:00.220)	61.2	60.7
(2023-05-26 18:43:00.220)	61.3	60.8
(2023-05-26 18:46:00.220)	61.2	60.6
(2023-05-26 18:49:00.220)	61.4	60.8
(2023-05-26 18:52:00.220)	61.2	60.6
(2023-05-26 18:55:00.220)	61.2	60.7



(2023-05-26 18:58:00.220)	61.1	60.6
(2023-05-26 19:01:00.220)	61.2	60.6
(2023-05-26 19:04:00.220)	61.1	60.6
(2023-05-26 19:07:00.220)	61.1	60.5
(2023-05-26 19:10:00.220)	61.2	60.6
(2023-05-26 19:13:00.220)	61.3	60.7
(2023-05-26 19:16:00.220)	61.3	60.7
(2023-05-26 19:19:00.220)	61.3	60.6
(2023-05-26 19:22:00.220)	61.2	60.6
(2023-05-26 19:25:00.220)	61.3	60.6
(2023-05-26 19:28:00.220)	61.4	60.7
(2023-05-26 19:31:00.220)	61.3	60.8
(2023-05-26 19:34:00.220)	61.5	60.8
(2023-05-26 19:37:00.220)	61.4	60.7
(2023-05-26 19:40:00.220)	61.7	60.9
(2023-05-26 19:43:00.220)	61.5	60.9
(2023-05-26 19:46:00.220)	62.8	60.8
(2023-05-26 19:49:00.220)	61.4	60.7
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(2023-05-26 20:07:00.220)	61.3	60.8
(2023-05-26 20:10:00.220)	61.5	60.9
(2023-05-26 20:13:00.220)	61.3	60.8
(2023-05-26 20:16:00.220)	61.4	60.9
(2023-05-26 20:19:00.220)	62.2	61
(2023-05-26 20:22:00.220)	61.7	61.2
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(2023-05-26 20:28:00.220)	61.7	61
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(2023-05-26 20:40:00.220)	61.6	61
(2023-05-26 20:43:00.220)	61.6	61.1
(2023-05-26 20:46:00.220)	61.9	61.3
(2023-05-26 20:49:00.220)	61.7	61.2
(2023-05-26 20:52:00.220)	61.6	61.1
(2023-05-26 20:55:00.220)	61.6	61
(2023-05-26 20:58:00.220)	61.7	61.2
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(2023-05-26 21:04:00.220)	61.8	61.2
(2023-05-26 21:07:00.220)	61.8	61.3
(2023-05-26 21:10:00.220)	61.7	61.2



(2023-05-26 21:13:00.220)	61.8	61.2
(2023-05-26 21:16:00.220)	62	61.2
(2023-05-26 21:19:00.220)	61	58.3
(2023-05-26 21:22:00.220)	58.9	57.9
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(2023-05-26 21:28:00.220)	59.1	58.3
(2023-05-26 21:31:00.220)	58.8	57.2
(2023-05-26 21:34:00.220)	58.5	56.8
(2023-05-26 21:37:00.220)	57.9	56.9
(2023-05-26 21:40:00.220)	57.5	56.6
(2023-05-26 21:43:00.220)	56.9	56.3
(2023-05-26 21:46:00.220)	57	56.3
(2023-05-26 21:49:00.220)	57	56.4
(2023-05-26 21:52:00.220)	56.9	56.2
(2023-05-26 21:55:00.220)	57	56.1
(2023-05-26 21:58:00.220)	54.3	50.7
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(2023-05-26 22:04:00.220)	52.8	47.5
(2023-05-26 22:07:00.220)	52.7	45
(2023-05-26 22:10:00.220)	48.7	42.4
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(2023-05-26 22:19:00.220)	47.4	42.9
(2023-05-26 22:22:00.220)	48.5	43.6
(2023-05-26 22:25:00.220)	46.2	42.1
(2023-05-26 22:28:00.220)	46.2	42.2
(2023-05-26 22:31:00.220)	48.4	42.2
(2023-05-26 22:34:00.220)	48.3	42.8
(2023-05-26 22:37:00.220)	47.5	42.7
(2023-05-26 22:40:00.220)	47.6	42.6
(2023-05-26 22:43:00.220)	48.4	42.4
(2023-05-26 22:46:00.220)	47.1	42.2
(2023-05-26 22:49:00.220)	50.1	42.9
(2023-05-26 22:52:00.220)	46.8	42.1
(2023-05-26 22:55:00.220)	45.5	41.8
(2023-05-26 22:58:00.220)	49.2	43.3
(2023-05-26 23:01:00.220)	48	41.8
(2023-05-26 23:04:00.220)	48.7	41.6
(2023-05-26 23:07:00.220)	46.9	41.5
(2023-05-26 23:10:00.220)	46.5	41.2
(2023-05-26 23:13:00.220)	49.1	42.3
(2023-05-26 23:16:00.220)	48.3	41.7
(2023-05-26 23:19:00.220)	50.1	41.9
(2023-05-26 23:22:00.220)	50.2	41.8
(2023-05-26 23:25:00.220)	48.7	41.7



(2023-05-26 23:28:00.220)	46.7	39.2
(2023-05-26 23:31:00.220)	50.1	39.6
(2023-05-26 23:34:00.220)	47.8	39
(2023-05-26 23:37:00.220)	51	39.9
(2023-05-26 23:40:00.220)	48.4	37.7
(2023-05-26 23:43:00.220)	48.1	33.9
(2023-05-26 23:46:00.220)	45.7	33.2
(2023-05-26 23:49:00.220)	42.6	30.8
(2023-05-26 23:52:00.220)	47.8	34.1
(2023-05-26 23:55:00.220)	46.1	32
(2023-05-26 23:58:00.220)	45.1	32
(2023-05-27 00:01:00.220)	49.2	33
(2023-05-27 00:04:00.220)	47.5	31.7
(2023-05-27 00:07:00.220)	47.2	32.4
(2023-05-27 00:10:00.220)	44.6	31.6
(2023-05-27 00:13:00.220)	44.8	32.5
(2023-05-27 00:16:00.220)	46.4	32.7
(2023-05-27 00:19:00.220)	44.2	31.8
(2023-05-27 00:22:00.220)	46.3	31.8
(2023-05-27 00:25:00.220)	47	31.8
(2023-05-27 00:28:00.220)	46.5	32.4
(2023-05-27 00:31:00.220)	44.5	32
(2023-05-27 00:34:00.220)	44	32.4
(2023-05-27 00:37:00.220)	47	31.6
(2023-05-27 00:40:00.220)	44.8	31.1
(2023-05-27 00:43:00.220)	43.6	31.5
(2023-05-27 00:46:00.220)	48	31.6
(2023-05-27 00:49:00.220)	46.9	31.9
(2023-05-27 00:52:00.220)	46	32.8
(2023-05-27 00:55:00.220)	43.6	32
(2023-05-27 00:58:00.220)	41.6	32.5
(2023-05-27 01:01:00.220)	52.8	34.5
(2023-05-27 01:04:00.220)	41.6	32.7
(2023-05-27 01:07:00.220)	43.8	32.8
(2023-05-27 01:10:00.220)	42.7	32.3
(2023-05-27 01:13:00.220)	43.1	31.9
(2023-05-27 01:16:00.220)	40.4	32.7
(2023-05-27 01:19:00.220)	39.6	31.7
(2023-05-27 01:22:00.220)	45.6	32.2
(2023-05-27 01:25:00.220)	40.7	31.9
(2023-05-27 01:28:00.220)	42	32.3
(2023-05-27 01:31:00.220)	45	31.4
(2023-05-27 01:34:00.220)	32	31
(2023-05-27 01:37:00.220)	31.7	30.9
(2023-05-27 01:40:00.220)	32.2	31.2



(2023-05-27 01:43:00.220)	43.2	31.8
(2023-05-27 01:46:00.220)	47.3	32.3
(2023-05-27 01:49:00.220)	42.1	31.6
(2023-05-27 01:52:00.220)	32.5	31.8
(2023-05-27 01:55:00.220)	42.6	32.5
(2023-05-27 01:58:00.220)	42.9	32.8
(2023-05-27 02:01:00.220)	39.4	32.5
(2023-05-27 02:04:00.220)	34.9	33.1
(2023-05-27 02:07:00.220)	42.6	33.1
(2023-05-27 02:10:00.220)	34.2	32.9
(2023-05-27 02:13:00.220)	43.4	32.5
(2023-05-27 02:16:00.220)	41.3	32.2
(2023-05-27 02:19:00.220)	40.6	32.8
(2023-05-27 02:22:00.220)	47.1	33.4
(2023-05-27 02:25:00.220)	38.5	33.1
(2023-05-27 02:28:00.220)	34	33
(2023-05-27 02:31:00.220)	34	33.1
(2023-05-27 02:34:00.220)	39.9	33.4
(2023-05-27 02:37:00.220)	43.2	33.2
(2023-05-27 02:40:00.220)	35	33.8
(2023-05-27 02:43:00.220)	34.4	33.5
(2023-05-27 02:46:00.220)	35.1	33.8
(2023-05-27 02:49:00.220)	39.2	33.6
(2023-05-27 02:52:00.220)	42.3	33.8
(2023-05-27 02:55:00.220)	46.8	33.8
(2023-05-27 02:58:00.220)	42.6	33.9
(2023-05-27 03:01:00.220)	44.5	33.9
(2023-05-27 03:04:00.220)	39.4	33.7
(2023-05-27 03:07:00.220)	44.7	34
(2023-05-27 03:10:00.220)	33.8	33.2
(2023-05-27 03:13:00.220)	35.4	33
(2023-05-27 03:16:00.220)	41.2	33.6
(2023-05-27 03:19:00.220)	34.5	33.5
(2023-05-27 03:22:00.220)	43.2	33.8
(2023-05-27 03:25:00.220)	34.3	33.5
(2023-05-27 03:28:00.220)	39.8	33.3
(2023-05-27 03:31:00.220)	33.6	32.9
(2023-05-27 03:34:00.220)	33.6	32.8
(2023-05-27 03:37:00.220)	44.5	32.8
(2023-05-27 03:40:00.220)	45.1	32.7
(2023-05-27 03:43:00.220)	40.4	33.7
(2023-05-27 03:46:00.220)	43.8	33.8
(2023-05-27 03:49:00.220)	43	33.4
(2023-05-27 03:52:00.220)	34.1	32.9
(2023-05-27 03:55:00.220)	34.9	33.2



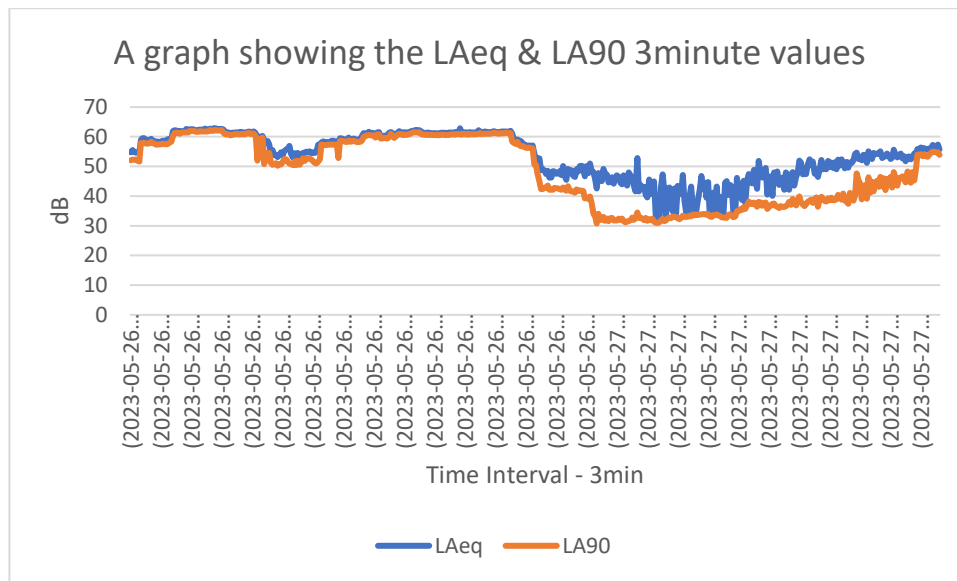
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(2023-05-27 04:01:00.220)	42.5	34.9
(2023-05-27 04:04:00.220)	43.4	35.6
(2023-05-27 04:07:00.220)	38.7	35.4
(2023-05-27 04:10:00.220)	45.2	36.3
(2023-05-27 04:13:00.220)	37.7	35.7
(2023-05-27 04:16:00.220)	45.4	37
(2023-05-27 04:19:00.220)	47.4	38.2
(2023-05-27 04:22:00.220)	44.8	37.5
(2023-05-27 04:25:00.220)	44.3	37.3
(2023-05-27 04:28:00.220)	48.8	37.8
(2023-05-27 04:31:00.220)	45	37.3
(2023-05-27 04:34:00.220)	42.5	36.4
(2023-05-27 04:37:00.220)	51.9	38.1
(2023-05-27 04:40:00.220)	47.4	37.8
(2023-05-27 04:43:00.220)	46.3	36.8
(2023-05-27 04:46:00.220)	48.4	37.6
(2023-05-27 04:49:00.220)	49.5	37.8
(2023-05-27 04:52:00.220)	40.5	35.7
(2023-05-27 04:55:00.220)	45.3	36.3
(2023-05-27 04:58:00.220)	46.7	36.8
(2023-05-27 05:01:00.220)	40.1	37.4
(2023-05-27 05:04:00.220)	48	37.5
(2023-05-27 05:07:00.220)	44.6	36.7
(2023-05-27 05:10:00.220)	48.3	36.4
(2023-05-27 05:13:00.220)	43.8	36
(2023-05-27 05:16:00.220)	44.4	36.7
(2023-05-27 05:19:00.220)	46.2	36.4
(2023-05-27 05:22:00.220)	42.2	36.3
(2023-05-27 05:25:00.220)	48	36.7
(2023-05-27 05:28:00.220)	47.4	37.1
(2023-05-27 05:31:00.220)	42.2	38
(2023-05-27 05:34:00.220)	46.2	37.1
(2023-05-27 05:37:00.220)	48.1	39
(2023-05-27 05:40:00.220)	43.5	38.4
(2023-05-27 05:43:00.220)	46.5	36.9
(2023-05-27 05:46:00.220)	48	38.7
(2023-05-27 05:49:00.220)	52	39.9
(2023-05-27 05:52:00.220)	51.3	37.9
(2023-05-27 05:55:00.220)	47.3	37.2
(2023-05-27 05:58:00.220)	48.9	36.7
(2023-05-27 06:01:00.220)	47.4	37.3
(2023-05-27 06:04:00.220)	50.5	38.1
(2023-05-27 06:07:00.220)	52.4	38.5
(2023-05-27 06:10:00.220)	50.5	38.8



(2023-05-27 06:13:00.220)	51.6	37.7
(2023-05-27 06:16:00.220)	47.5	39
(2023-05-27 06:19:00.220)	48.9	39.6
(2023-05-27 06:22:00.220)	46.5	36.4
(2023-05-27 06:25:00.220)	48.8	38.8
(2023-05-27 06:28:00.220)	52.2	39.8
(2023-05-27 06:31:00.220)	49	39.1
(2023-05-27 06:34:00.220)	49.7	38.4
(2023-05-27 06:37:00.220)	49.1	38.2
(2023-05-27 06:40:00.220)	51.9	39.2
(2023-05-27 06:43:00.220)	49.8	38.6
(2023-05-27 06:46:00.220)	51.3	39.4
(2023-05-27 06:49:00.220)	49.5	38.6
(2023-05-27 06:52:00.220)	51.4	38.7
(2023-05-27 06:55:00.220)	49	38.9
(2023-05-27 06:58:00.220)	52.3	40.4
(2023-05-27 07:01:00.220)	50.3	39.5
(2023-05-27 07:04:00.220)	52.4	38.8
(2023-05-27 07:07:00.220)	51	40.9
(2023-05-27 07:10:00.220)	49.4	38.6
(2023-05-27 07:13:00.220)	51.5	38
(2023-05-27 07:16:00.220)	49.6	37.4
(2023-05-27 07:19:00.220)	51.3	41.1
(2023-05-27 07:22:00.220)	51.2	39
(2023-05-27 07:25:00.220)	52.1	38.5
(2023-05-27 07:28:00.220)	54.2	40.1
(2023-05-27 07:31:00.220)	54.7	47.6
(2023-05-27 07:34:00.220)	52.5	45.3
(2023-05-27 07:37:00.220)	52.7	44.2
(2023-05-27 07:40:00.220)	52.1	38.9
(2023-05-27 07:43:00.220)	53.9	42.5
(2023-05-27 07:46:00.220)	53.8	43.8
(2023-05-27 07:49:00.220)	51.2	39.1
(2023-05-27 07:52:00.220)	55.1	46.4
(2023-05-27 07:55:00.220)	53.8	41.2
(2023-05-27 07:58:00.220)	52.5	44.8
(2023-05-27 08:01:00.220)	54.6	41.6
(2023-05-27 08:04:00.220)	54.1	44.4
(2023-05-27 08:07:00.220)	54.3	45.2
(2023-05-27 08:10:00.220)	54.2	43.1
(2023-05-27 08:13:00.220)	55.1	46.5
(2023-05-27 08:16:00.220)	52.8	43.3
(2023-05-27 08:19:00.220)	53.6	46
(2023-05-27 08:22:00.220)	53.4	42
(2023-05-27 08:25:00.220)	54.3	45.8



(2023-05-27 08:28:00.220)	53.5	44.6
(2023-05-27 08:31:00.220)	52.5	46.5
(2023-05-27 08:34:00.220)	52.9	42.9
(2023-05-27 08:37:00.220)	55.6	48.1
(2023-05-27 08:40:00.220)	53.8	45.8
(2023-05-27 08:43:00.220)	53	43.6
(2023-05-27 08:46:00.220)	53.9	46.1
(2023-05-27 08:49:00.220)	54.3	45.9
(2023-05-27 08:52:00.220)	52.7	46.7
(2023-05-27 08:55:00.220)	53.5	45.8
(2023-05-27 08:58:00.220)	51.7	44.6
(2023-05-27 09:01:00.220)	53.2	48.3
(2023-05-27 09:04:00.220)	53.4	47.5
(2023-05-27 09:07:00.220)	52.4	44.5
(2023-05-27 09:10:00.220)	52.9	48.1
(2023-05-27 09:13:00.220)	54.3	45.3
(2023-05-27 09:16:00.220)	54.4	48.8
(2023-05-27 09:19:00.220)	55.8	54
(2023-05-27 09:22:00.220)	56	54
(2023-05-27 09:25:00.220)	56.4	54.1
(2023-05-27 09:28:00.220)	55.7	53.5
(2023-05-27 09:31:00.220)	56.2	54.1
(2023-05-27 09:34:00.220)	55.6	53.4
(2023-05-27 09:37:00.220)	55.9	53.3
(2023-05-27 09:40:00.220)	55.9	54
(2023-05-27 09:43:00.220)	56.2	54.5
(2023-05-27 09:46:00.220)	57.2	55
(2023-05-27 09:49:00.220)	56.6	54.9
(2023-05-27 09:52:00.220)	56.7	54.8
(2023-05-27 09:55:00.220)	57.3	54.8
(2023-05-27 09:58:00.220)	55.7	53.9



Inlet calculation with No silencers included

Fan - Inlet	63	125	250	500	1K	2K	4K	8K	Overall	
Axial AC YWF4E-450S-P102/60G	78	71	66	63	62	84	80	0		
SWL dB	86	79	74	75	70	72	67	0	87	dB Lw
Distance	2	2	2	2	2	2	2	0		
DI	6	6	6	6	6	6	6	0		
Point Source Attenuation	-17	-17	-17	-17	-17	-17	-17	0		
2 x SURL 500 900 silencers	0.00	0	0	0	0	0	0	0		
Internal Floor	-35	-35	-35	-35	-35	-35	-35	0		
Level at facade	40	33	28	29	24	26	21	0	42	dB
	14	17	19	26	24	27	22	-1	32	dB(A)
						Loss through window			-13	dB
						Façade rating level			19	dB(A)



Outlet – No silencers

Fan - Outlet										
	63	125	250	500	1K	2K	4K	8K	Overall	
Axial AC YWF4E-450S-P102/60G	78	71	66	63	62	64	59	0		
SWL dB	86	79	74	75	70	72	67	0	88	dB Lw
Distance	2	2	2	2	2	2	2	20		
DI	6	6	6	6	6	6	6	6		
Point Source Attenuation	-17	-17	-17	-17	-17	-17	-17	-37		
2 x SIRL 500 900	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Internal Floor	-35	-35	-35	-35	-35	-35	-35	-35		
Level at façade	40	33	28	29	24	26	21	-66	42	dB
	14	17	19	26	24	27	22	-67	32	dB(A)
						Loss through window			-13	dB
						Flat internal level			19	dB(A)

Duct breakout

Fan Case Breakout										
	63	125	250	500	1K	2K	4K	8K	Overall	
Axial AC YWF4E-450S-SWL dB	78	71	66	63	62	64	59			
	86	79	74	71	70	72	67		87	dB Lw
duct length	4	4	4	4	4	4	4			
duct loss per m	0.07	0.07	0.07	0.1	0.16	0.16	0.16			
duct attenuation	-0.28	-0.28	-0.28	-0.4	-0.64	-0.64	-0.64			
Duct Skin	-8	-13	-20	-24	-29	-33	-39			
	0									
Visible Perimeter	1.41	1.41	1.41	1.41	1.41	1.41	1.41			
length	3.7	3.7	3.7	3.7	3.7	3.7	3.7			
perimeter x length (S)	5.217	5.217	5.217	5.217	5.217	5.217	5.217			
Duct Cross Section (m2) (A)	0.16	0.16	0.16	0.16	0.16	0.16	0.16			
10log (S/A)	15.1	15.1	15.1	15.1	15.1	15.1	15.1			
Losses	0.0	2.1	-4.9	-8.9	-13.9	-17.9	-23.9			
Minimum -3	-3	-3	-3	-4.9	-10.9	-16.9	-22.9			
	0									
Lw radiated	82.72	75.72	70.72	65.7	58.46	54.46	43.46			
	0									
Distance	1	1	1	1	1	1	1			
DI	3	3	3	3	3	3	3			
Point Source Attenuation	-11	-11	-11	-11	-11	-11	-11			
SIRL 500 900 silencer x 2	-5.00	-7	-14	-21	-19	-17	-14			
silencer	0	0	0	0	0	0	0			
External duct wrap	0	0	0	0	0	0	0			
Level at Façade	70	61	49	37	31	29	21		70	dB
	44	45	40	34	31	30	22		48	dB(A)
	0									
	0									
	0					Loss Through window			-13	dB
	0					Flat internal level			35	dB(A)



Duct Discharge

Discharge	63	125	250	500	1k	2k	4k	8k	overall	
Axial AC YWF4E-450S- P102/60G	78	71	66	63	62	64	59	0		
SWL dB	86	79	74	75	70	72	67	0	88	dB
Duct Length (m)	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2		
Duct loss per m	0.25	0.2	0.1	0.03	0.03	0.03	0.03	0.03		
Duct Attenuation	-1.1	-0.8	-0.4	0	-0.1	-0.1	-0.1	-0.1		
End Reflection	-12	-7	-3	-1	0	0	0	0		
Bends	0	-1	-2	-3	-3	-3	-3	-3		
Corrected SWL	73.0	70.2	68.6	71	66.9	68.9	63.9	0.0		
Distance	2	2	2	2	2	2	2	2		
DI	0	0	0	0	0	0	0	0		
Point Source Attenuation	-17	-17	-17	-17	-17	-17	-17	-17		
Silencer	-5	-7	-14	-21	-19	-17	-14	0		
level at facade	50.9	46.1	37.6	33.0	30.9	34.9	32.9	-17.0	53	dB
	24.7	30.0	29.0	29.8	30.9	36.1	33.9	-18.1	40	dB(A)
	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1		
								loss through window	-13	dB
								Flat Internal Level	27	dB(A)