



DESIGN ENGINEER SUSTAIN

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Chorlton Precinct, Development

Ventilation Statement

QA

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Section 1 - Introduction

Futureserv have been appointed by PJ Livesey to produce a Ventilation Statement in support of a full planning application for the demolition of the existing shopping precinct and Graeme House and the construction of a residential-led mixed-use development comprising 262 residential units, ground floor commercial uses, external landscaping/public realm, ground and surface parking with associated access arrangements. A total of 6 development blocks are proposed with associated core facilities and plant spaces.

The development also includes ground floor retail units, ground and basement car parking and associated core facilities and plant spaces.

This Ventilation Statement has been prepared to illustrate the proposed ventilation designs. It addresses the building regulation requirements described within Approved Document Part F, 2021 for ventilation to the various facets of the proposed development.

The statement also highlights the need to provide complete, energy efficient, fully working and balanced ventilation systems that can:-

- Deliver sufficient outdoor fresh air to occupants;
- Deliver good indoor air quality;
- Ensure acceptable internal noise levels are not exceeded;
- Assist in the removal of heat gains;
- Remove odours, contaminants and moisture;
- Avoid cold draughts;
- Assist in avoidance of summertime overheating;
- Provide summertime night time cooling of the building fabric when required;
- Provide an easily controlled and maintainable system;
- To prevent cross infection (by full fresh air and negative pressure regime);
- To recover heat from the exhaust air stream for re-use in the fresh air supply.

Futureserv Consulting Engineers have collaborated with the design team to provide a holistic solution for the building that will provide an efficient envelope and contain intelligent building services reducing the environmental impact of the proposed development whilst providing comfortable living and working accommodation.

Section 2 - Design

The ventilation design shall comply with the following building regulation approved documents and standards:

Design Standards

The ventilation systems will be designed in accordance with recognised UK and industry best practice.

Design will be based on standards and guidelines, including:

- British and European Standards (BSI).
- Chartered Institution of Building Services Engineers (CIBSE).
- Building Services Research and Information Association (BSRIA).
- Building Research Establishment (BRE).
- Heating & Ventilating Contractors Association (HVCA).

Statutory Requirements

Ventilation systems design will also be based on the following Statutory Requirements:

- The Building Regulations
- Clean Air Act
- The Control of Pollution Act
- The Construction (Design and Management) Regulations
- British Standards and Codes of Practice
- Local Council Planning Conditions & Requirements

Section 3 – Ventilation Rates

Area/Room	Ventilation Criteria
Dwellings	To meet Approved Document Part F of the Building Regulations - "Means of Ventilation" Section 5, New dwellings, System 4 – Continuous mechanical supply and extract with heat recovery (MVHR)
Entrance & Amenity spaces	10l/s/person
WCs	6 ACH
Stores	2 ACH
Refuse	5l/s/m ²
Mechanical and electrical plant rooms	To be provided with natural ventilation or mechanical ventilation as appropriate to their use.
Carpark	3, 6, & 10 ACH

Section 4 - Ventilation Strategy

4.1 - Basis of Design

The ventilation strategy has been designed to comply with the Building Regulations approved document Part F Means of Ventilation, 2021, Domestic and Non-Domestic Ventilation Compliance guides.

This document describes the basis of the design and outline scope of ventilation works for the various parts of the proposed development.

Abstract from Approved Document Part 'F'

Table 1.2 Minimum extract ventilation rates for continuous extract systems⁽¹⁾

Room	High rate (l/s)	Continuous rate
Kitchen	13	The sum of all extract ventilation in the dwelling on its continuous rate should be at least the whole dwelling ventilation rate given in Table 1.3
Utility room	8	
Bathroom	8	
Sanitary accommodation	6	
NOTE:		
1. If the continuous rate of ventilation provided in a room is equal to or higher than the minimum high rate specified in the table, no extra ventilation is needed.		

Table 1.3 Minimum whole dwelling ventilation rates determined by the number of bedrooms

Number of bedrooms ⁽¹⁾⁽²⁾	Minimum ventilation rate by number of bedrooms (l/s)
1	19
2	25
3	31
4	37
5	43
NOTES: 1. If the dwelling only has one habitable room, a minimum ventilation rate of 13l/s should be used. 2. For each additional bedroom, add 6l/s to the values in Table 1.3.	

4.2 – Apartments Ventilation

The living space ventilation systems will be designed to operate continuously at low speed air volumes created by energy efficient fans. This will allow the construction of a tightly sealed and correctly ventilated environment reducing thermal heat loss through reduced infiltration, whilst at the same time improving air quality and reducing the occurrence of moisture and mould.

To provide minimum fresh air rates to the living spaces each habitable space will be provided with a whole dwelling mechanical ventilation heat recovery (MVHR) system. This system comprises of a continuous mechanical supply and extract ventilation unit located in a suitable position based on the space design.



Image of Wall Mounted MVHR units

The units will be provided with a high level of heat recovery efficiency for example an integrated counterflow heat recovery cell designed to aid part L compliance of the Building Regulations as detailed within the Energy Statement prepared in support of the application.

The air volumes will be determined to satisfy the requirements of the Approved Document Part F of the Building Regulations (see abstract from Approved Document Part F).

Each unit will intake fresh air and discharge exhaust air through the façade. The intake and exhaust louvres will be located a suitable distance apart to prevent cross contamination.

An intake supply filter inside the unit will be provided to remove incoming particulate and pollen matter.

The ventilation unit will remove air from the bathrooms and kitchens and provide air to the habitable rooms; namely the bedrooms and the living spaces, this will be via a rigid flat ductwork system with supply and extract air grilles located in the ceilings.

These systems shall operate day to day automatically and be controlled to vary ventilation rates via EC/DC motors' as they receive signals from one of the interconnected sensors and controllers such as a humidity sensor. When a signal is received the fans shall vary their speed proportionally or on a trickle and boost principle. The units may also be provided with manual control by means of switch control serving kitchens and ensembles.

Ventilation extract boost will be operated by a switch located in the kitchen. The MVHR will also incorporate summer bypass.

The units shall have the facility to commission the supply and extract fans individually via inbuilt minimum and maximum speed adjustments, or alternative wired remote-control unit. The fans themselves shall have independent, infinitely variable speed control.

The ventilation systems will be designed in rooms to meet the noise levels stated within available Acoustic design specifications. These figures will apply for all supply and extract systems.

Louvres on the façade shall be required for connecting the MVHR ventilation ductwork intake and discharge points to outside.

Attenuators will be installed to reduce external noise intrusion.

Cookers will be provided with recirculation hoods, as specified during detailed design.

The MVHR units will be fitted with G3 filters as standard. During occupation the tenants have the option to replace these filters in line with the MVHR installation and user guide replacement with G3 filters or enhanced filtration of M5 or F7. Heat Recovery units require regular maintenance. The unit shall be designed to facilitate access to facilitate enable maintenance to be carried out easily. The MVHR unit shall display a warning symbol, code, light or similar to confirm cleaning or replacement filters is overdue.

The MVHR units shall be fitted with Nox filters where required in line with the requirements of the air quality assessment.

Part F Purge Ventilation & Part O Overheating

Purge ventilation, giving the occupant final control over their environment, will be provided by free area natural ventilation opening windows in the building façade and a boost mode on the MVHR units. These openings shall only be used for purge and overheating comfort, with day-to-day ventilation being provided by the mechanical MVHR systems.

Purge Ventilation shall be provided to each habitable room (Bedrooms and Living / Kitchens) within each apartment. Purge Ventilation shall be provided via opening windows installed in the façade. These openings are to be provided alongside an MVHR summer/purge boost mode (as required) which shall be operated locally via a manual switch within each apartment.

It should be noted that the windows are purely for user comfort and shall satisfy the building regulations compliance for purge ventilation for odour control and to offset summertime overheating.

Effective ventilation area openings shall be in line with the minimum requirements set out in Approved Document Part F of the Building Regulations including Appendix B.

4.3 –Amenity Spaces

Local Heat Recovery units shall be provided to supply tempered fresh air to each of these spaces. The units shall be located locally within the ceiling voids of the area served discharging to atmosphere via local louvres within the facade. The units shall be of the heat recovery type as per Mitsubishi Lossnay units or equal and approved. The units shall generally comprise of the following sections: -

- Return air fan
- Air intake louver
- Motorised shut off damper
- Fresh air filter (F7 Grade Filter)
- Extract filter (M5 Grade Filter)
- Counter flow heat exchanger (providing heat recovery)
- Supply fan
- Local controllers provided on each office floor plate.

The systems shall be controlled to supply a constant air volume during occupied hours to meet minimum fresh air requirements and be provided with manufacturers controls package to ensure fresh air rates and temperatures are maintained at comfortable levels and allow connection to the central building management system.

The spaces shall be ventilated to provide 12l/s per person.

Heat Recovery units shall be mounted within the ceiling void and these will be routed via rigid ductwork to supply and extract grilles located in the ceiling.

Intake and exhaust ductwork will be insulated to prevent condensation.

Louvres on the façade shall be required for connecting the ventilation ductwork intake and discharge points to outside. The louvres have been included within the final fixed scheme following design co-ordination with the architect and other relevant consultants

Attenuators will be installed on the fresh air intakes to reduce external noise intrusion.

Commercial kitchens spaces shall be served by means of dedicated internal kitchen extract systems. The system shall comprise of bifurcated fans, attenuation and all associated localised grease/smoke removal and odour neutralising equipment, all to be located internally within the tenant's demise. The kitchen exhausts shall be ducted to terminate at the facade with the required filtration to satisfy the DEFRA guidance documentation for the control of odour & noise from commercial kitchen extract systems.

Fresh make up air will be required to the kitchens provided by supply only ventilation units located internally within the tenants demise with air-conditioned air if required. This will all form part of the fitout installation works.

4.4 – Toilets, Refuse, Cleaners & Plant area Ventilation

Toilet, refuse and cleaners rooms will be ventilated by means of mechanical extract systems with the fan units located locally to the space they are serving. Make up air shall be provided naturally via one of the following methods: undercut doors, door transfer grilles, transfer ducts or make-up air drawn directly from outside via a louvered façade. Subject to the extent of air volumes required.

The local WC extract fans shall be complete with the following.

- Time clock controller
- Electronic fan speed controller
- Fan auto changeover facility
- Duty/share facility which changes the lead fan every 12 hours
- AV mounts

- Back draught shutters
- Ductwork distribution system rising vertically through the building

Plant areas shall be naturally ventilated through louvred doors/louvres in the façade.

4.5 – Smoke Ventilation System

A smoke clearance system shall be installed that shall operate automatically in the event of a fire within the residential sections of the development.

The contractor shall provide an automatic opening vent (AOV) at the head of each of the stair cores. This shall open automatically at the dictates of the fire control panel to provide make up air for the smoke clearance system. Air shall be transferred to the corridor through the door opening onto the affected floor from the stair core.

A grille complete with fire damper (Lobby Ventilator) located at high level within the residential corridor shall open automatically at the dictates of the fire control panel to allow the passage of smoke from the affected corridor, into the mechanical smoke shaft formed within the core area. A dedicated corridor smoke detector located at each level shall be used to actuate the fire damper at the affected floor.

Fans at roof level, controlled automatically by the fire control panel, once energised shall extract smoke from the building through the automatic opening vents. The fans shall be run in duty / standby mode to ensure operation in the event of a fan failure.

4.6 - Basement Level – Car Park Ventilation Systems

The basement/covered car parks shall be provided with a full mechanical extract ventilation system compliant with Approved Documents B & F of the current Building Regulations and designed in accordance with British Standard BS7346: Part 7: 2013.

The system is to be designed to provide smoke dispersal in accordance with BS7346: Part 7: 2013 Clause 9 in the event of fire.

Fresh air will be drawn into the car park via the ramps. The roller shutters will open in the event of a fire to maximise the makeup air into the carparks. Contaminated air will be extracted via two main extract fans mounted in parallel. The main fans will be located in the ground floor plant room and discharge at ground floor via louvres within the façade of the buildings. Local impulse/jet fans will be strategically located around both carparks on all levels to direct the smoke to the louvres and smoke shaft arrangement per level.

CO monitoring will be adopted to reduce energy consumption and to reduce the running costs for day to day ventilation by varying the rate of ventilation according to the level of traffic movement.

Daily Ventilation

Under “normal” ventilation conditions, air will be drawn through all parts of the car park at a rate equivalent to approximately 3 air changes per hour and the induction fans will operate at low speed.

CO pollution levels will be continually monitored. On detection of CO levels rising beyond 20ppm, the induction fans will operate at low speed to mix and dilute the CO gases for extract via the main fans.

Should the CO level continue to rise to 30ppm, the air change rate will increase to 6 per hour.

The main extract fans will vary in speed according to the exhaust pollution levels within the car park, thereby providing the 3 to 6 air changes per hour.

Fire Condition

A fire signal will be received via the smoke detection system.

On detection of fire, the main fans will operate at full speed and the extract damper serving the non-fire floors will close, increasing the airflow to at least 10 air changes per hour to the fire floor. The induction fans on the fire floor will activate at high speed, with those on the non-fire floors being switched off.

A fire service's override switch will be installed to enable the attending fire service personnel to switch the system off if required. The fire service's switch will be wired back to the main control panel.

In order to achieve good distribution of air flow, the mechanical extract ventilation will be supported with impulse fans located around the car park (as required by CFD analysis via the car park ventilation specialists).

5.0 – Conclusion

The ventilation strategy improves on the fundamental principles of the Building Regulations and will make a contribution to reducing the annual CO₂ emissions of the proposed development.

The proposed development will incorporate energy reduction measures in the ventilation systems to reduce the carbon footprint of the site using heat recovery devices and energy efficient fan selections.

Waste heat will be recovered by the mechanical ventilation heat recovery (MVHR) systems. This type of ventilation will help to reduce heat demand and provide filtered air to the extra care apartments thus promoting healthy living

conditions for the occupants. All fans and motors shall be specified to incorporate ECA accredited technology and appropriate controls.