CPU Relocation

Ventilation & Extraction Statement

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1 Introduction

Stantec UK Ltd have been appointed by the University of Manchester to provide MEP design services in relation to the design and construction of the proposed refurbishment works at the Hulme Hall site which is situated

This document forms part of the planning application for the site and will inform the Manchester City Council Planning Department of the proposed energy strategy for the site.

1.1 Site and Location

The proposed site is located within the Victoria Park campus in Rusholme, Manchester and forms part of the University of Manchester Estate.

1.2 Development Description

The works are contained within the existing Hulme Hall kitchen and dining hall block and associated external areas.

The project seeks to provide a new extended kitchen at first floor level to serve the Hulme Hall catered residences and a new commercial kitchen at ground floor level to reprovide the University's Central Processing Unit (relocated from the nearby Fallowfield Campus)

The MEP strategy involves the provision of dedicated systems to serve the new kitchens with plant located within existing plantrooms and above the existing plantroom roof.

The proposed development is a refurbishment scheme and is reviewed against policy and regulation against refurbishment requirements.



Figure 1: Site Location

2 Design Criteria

2.1 Regulations and Guides

- Building Regulations 2021 - Approved Document F
- CIBSE Guide B2 - Ventilation and ductwork
- CIBSE Guide B0 - HVAC Strategies for common building types
- EMAQ Control of Odour and Noise from Kitchen Exhaust Systems
- BESA DW144 - Specifications for Sheet Metal Ductwork
- BESA DW172 - Specifications for Kitchen Ventilation Systems

2.2 Minimum Ventilation Requirements

The minimum ventilation rates for each space have been determined by Approved Document F and CIBSE Guide B where applicable. They are shown in Table 1.

Table 1: Minimum Ventilation Rates

Room	Ventilation Rate
General Areas	10 l/s/person
Toilets	6 ACH-1
Cleaner's Stores, Refuse Stores & Showers	10 ACH-1
Kitchen	DW 172 based on equipment and specialist requirements
Plant Rooms	To suit plant loads, mechanical or natural supply and extract
Dishwash Area	DW 172 based on equipment
Kitchen Stores	DW 172 based on equipment

*Enhanced ventilation rates for TM52 thermal comfort compliance requirements.

2.3 Breakout Noise

The ventilation systems will include appropriate attenuation to ensure that noise breakout is in accordance with BS 4142.

Table 2: Internal Noise Levels

Area	NR Level
Kitchen	40
Bathrooms, Toilets	45
Circulation / Corridors	40
Office	40

3 Ventilation Strategy

3.1 General

The design and installation of the ductwork distribution system will be to the requirements of B&ESA DW144 for general systems and DW172 for kitchen ventilation systems.

Design guidance from the University Estates Procedure Manuals will be adopted to ensure ventilation services are provided in line with university requirements.

Fresh air will be tempered via LTHW heater batteries located within the Air Handling Unit.

3.2 Ventilation Plant

The ventilation plant will be located within the first-floor plant areas as follows:

- Packaged supply Air Handling Unit (located within internal plant area at first floor)
- 3No CPU Kitchen Extract Fans (high temperature fan – externally located on first floor roof)
- 2No CPU Kitchen General Extract fans (dishwash extract and allergen extract) located within ground floor ceiling voids
- 1No Hulme Hall kitchen extract fan (high temperature bifurcated fan – internally located within mezzanine plant room)
- 1No Hulme Hall kitchen general dishwash extract fan located within mezzanine plant room
- 1No combined COSHH extract fan located within mezzanine plant room

3.3 Combined Supply Air System

The AHU will deliver filtered and tempered fresh air to the internal spaces. The Kitchen supply AHU system will include the following functions:

- Atmospheric shutoff dampers
- Filtration
- LTHW Heater Battery (low LTHW temperatures)
- Variable volume inverter driven supply fan complete with Danfoss inverters.

The common supply ductwork system will be routed to the various ground floor and first floor kitchen supply grilles and cooking canopies via ceiling voids and risers.

The kitchen canopy supply will be provided at a maximum volume of 85% of the canopy extract air volume. The remaining 15% makeup air will be provided into the general kitchen area. This will ensure that the kitchen air balance is maintained at negative pressure to contain the vitiated kitchen air within the cooking area.

3.4 Kitchen Extract Systems

Dedicated fire rated kitchen extract ductwork system will be provided in line with the requirements of DW172 and the catering specialist.

Ventilation interlock systems will be provided for ground floor CPU kitchen and first floor Hulme Hall kitchen areas via dedicated ventilation panel within each kitchen area. These will prevent the cooking equipment beneath the canopy from being operated without the corresponding extract fan running. These interlock systems will also incorporate a setback ventilation switch to allow users to switch between "Cook" and "Setback" modes of operation. Setback will allow either kitchen to be independently set back to a much reduced air volume as an energy saving measure.

The extract fans and AHU will incorporate an interlock to ensure that they run simultaneously.

Extracted air will be filtered at the extract canopy with additional fine filtration and UV treatment in line with the Kitchen Odour Risk Assessment recommendations.

The following equipment will be located within the kitchen extract ductwork within the cook area ceiling void.

- Grease filtration - to remove grease particles from the air stream. This also reduces the fire risk from grease entering the ductwork.
- Fine filters - to remove particles such as soot from the airstream.
- Ultraviolet & Ozone Odour Control Unit - to reduce the odours in the airstream

The extract fan will maintain inward air flow, reducing the risk of kitchen exhaust air entering the wider building.

The Kitchen extract system will comprise:

- Cooker hood / canopy
- Stainless Steel grease filter
- Fire rated ductwork
- Fine prefilter
- Ultraviolet & Ozone Odour Control Unit,

- Melinex type attenuators
- High temperature, motor out of air stream extract fans
- Anti-vibration mountings

3.5 General Extract Systems

The general ventilation shall meet the minimum ventilation rates for each space as shown in Table 1. All ventilation shall have the appropriate filtration and meet noise breakout standards in accordance with BS 4142.

3.6 Local Extract Systems

Local extract fans will be provided to serve the following plantroom areas:

- COSHH Store extracts (continuously running)

3.7 Fresh Air Inlet and Exhaust Strategy

Fresh air inlet and exhaust louvres will be provided within the external façade to accommodate the ventilation requirements of internally located ventilation systems (Supply AHU, General Extract, Allergen Extract).

Swedish cowl type discharge terminals will be provided for all greasy kitchen canopy extract systems (3No for the CPU kitchen, 1No for the first floor Hulme Hall kitchen).

Standard “mushroom” type exhaust cowls will be provided for the first floor Hulme Hall general extract and COSHH extract fans at the upper roof level.

3.8 Attenuators / Silencers

Sound attenuators will be provided in all ductwork connections (fresh air, supply air, extract air, exhaust air) to ensure that room side and atmospheric side noise criteria are achieved.

Coated attenuators, appropriate for greasy extract, will be utilised on all kitchen canopy extract systems.

3.9 Ductwork

Supply and extract ductwork will be routed from the AHU to the spaces served.

Supply and extract ductwork systems will be provided with Volume Control Dampers (VCDs) to allow full balancing to be achieved.

All external and atmospheric side ductwork will be insulated to minimise heat losses and gains and to prevent condensation.

3.10 Fire Dampers / Fire Rated Ductwork

Fire dampers will be provided wherever ductwork passes through fire compartment walls or floors. Motorised fire and smoke dampers will be provided if required by building control or the fire officer or as part of the emerging fire engineering strategy. Note, no fire dampers are permitted on greasy extract systems, these will be fire rated from canopy spigot to discharge location.

The ductwork distribution system will be complete with access panels at required spacing and changes of direction, either side of fire dampers and where equipment requires maintenance access in line with B&ESA TR19.

3.11 Grilles & Canopies

Supply and extract air to general spaces will be provided via louvre faced diffusers or double deflection side wall grilles. Disc valves will be utilised within toilet areas.

Canopies will be provided for all cook areas and dishwash areas as specified by the catering specialist.

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