

Invicta House, Manchester

Ventilation Statement

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008 and BS EN ISO 14001: 2004)

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1. Introduction

This report is provided to supplement the Planning Submission for the development of the new Hotel Project. The new building is located within Manchester City Centre, bounded by Tivoli Street and Atkinson Street.

The development includes the construction of a new eight storey hotel with ground floor bar/dining/lounge areas, basement plant area and rooftop plant area.

This report provides information on the proposed ventilation systems for the project.

2. Ventilation General

2.1 Fire Protection

Ventilation system shall be designed and installed to meet the building fire strategy and Regulatory requirements. This shall include the use, as necessary, of fire rated duct work and fire/smoke dampers.

2.2 Acoustic Performance

Ventilation systems and plant shall be designed and selected to achieve the acoustic performance as detailed within the Noise and Vibration Assessment document, provided to support this planning application, to comply with the Local Authority requirements in relation to limiting noise from the development. This shall include the use, as necessary, of attenuation, internal/external anti-vibration mounts to plant and support/bracket systems, acoustic wrapping and attenuation within duct systems.

2.3 Identification

All ventilation system shall be provided with identification in accordance with BS 1710.

2.4 Thermal Insulation

All ducted ventilation systems shall be provided with thermal insulation, as necessary. This shall include the thermal insulation of all conditioned air carrying ducts and extract ducts when extract is used as part of a heat recovery system. Additional insulation shall be provided to protect against unwanted condensation forming on duct surfaces as necessary.

2.5 Access and Maintenance

All ductwork system shall be designed to provide the appropriate level of access to internal surfaces for cleaning and maintenance expectations. This shall be compliant with the requirements of the Heating and Ventilation Contractors Association (HVCA) Documents; DW 144, DW145, DW 172, Chartered Institute of Building Services Engineers (CIBSE) Guides B and M and The Building Regulation Part F Ventilation 2010.

3. Hotel Ventilation Systems

Mechanical ventilation shall be provided to serve the hotel areas as follows: -

1. General mechanical supply and extract ventilation system (AHU:1 and 2)
2. Ground Floor Public area and Kitchen mechanical supply and extract ventilation system (AHU:3)
3. Ground floor public and staff toilet mechanical extract ventilation system
4. Water tank room mechanical supply and extract ventilation
5. Boiler Room mechanical supply and extract ventilation
6. HV/LV switch room mechanical extract system

3.1 General mechanical supply and extract ventilation system (AHU: 1 and 2)

A general mechanical supply and extract ventilation system shall be provided to serve the hotel bedroom suites, ironing rooms, lift lobbies and corridors on levels 1 to 8 as indicated on the drawings. The systems shall be served via and Air Handling Unit (AHU1 and 2) plant located on the roof of the building within the plant screen.

The AHUs shall operate continuously 24hrs, 7 days per week. The AHU shall be constant volume. However, the AHU shall be fitted with inverter speed control of fans to allow trimming of air flows during the commissioning of the ventilation system.

The AHU shall be fitted with internal DX heat pump coils (condenser in extract air stream) to allow heat recovery and efficient operation. The AHU shall be provided with LTHW served frost coils. The AHU shall be served by an integral thermal wheel.

The ventilation system shall be interfaced with the fire alarm system and shall shut down in alarm conditions.

The air handling units are located on the rooftop plant area, drawing in fresh air and discharging extracted air, with duct terminals located to avoid recirculation of exhausted air.

3.2 Ground Floor Public Area and Kitchen mechanical supply and extract ventilation system (AHU3)

A general mechanical supply and extract ventilation system shall be provided to serve the ground floor public area, office, meeting room, supply to toilets and kitchen area as indicated on the drawings. The system shall be served via and Air Handling Unit (AHU3) plant located on the roof of the building within the plant screen.

The AHU shall operate continuously 24hrs, 7 days per week. The AHU shall be constant volume. However, the AHU shall be fitted with inverter speed control of fans to allow trimming of air flows during the commissioning of the ventilation system.

The AHU shall be fitted with internal DX heat pump coils (condenser in extract air stream) to allow heat recovery and efficient operation. The AHU shall be provided with LTHW served frost coils. The AHU shall be served by an integral thermal wheel.

The kitchen area is a low use, reheat kitchen. The area is to be served by an ultravent recirculating cooker hood unit. The air handling unit AHU 3 vent system provides general vent to the spaces.

The air handling unit is to be located on the rooftop plant area, drawing in fresh air and discharging extracted air, with duct terminals located to avoid recirculation of exhausted air.

Kitchen extract system odour control.

An assessment has been completed to assess the requirements for odour control on kitchen extract systems.

The following assessment is based on the Department for Environment, Food and Rural Affairs (DEFRA) Document; *"Guidance on the control of Odour and Noise from Commercial Kitchen Exhaust Systems, January 2005"*

The risk assessment is based upon a scoring methodology whereby;

Impact Risk	Odour control requirement	Significance Score*
Low to Medium	Low Level Odour control	Less than 20
High	High Level Odour Control	20 to 35
Very High	Very high level Odour control	More than 35

* *Based on the sum of the contributions from dispersion, proximity to receptors, size of the kitchen and cooking type.*

The following table details the performance requirement and associated score for Dispersion, Proximity of receptors, size of kitchen and cooking type factors.

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into court yard or restriction on stack
	Poor	15	Not low level but below eaves, or discharge below 10m/s
	Moderate	10	Discharging 1m above eaves at 10-15m/s
	Good	5	Discharging 1 m above eaves at 15m/s
Proximity of Receptors	Close	20	Closest sensitive receptor less than 20 for kitchen discharge
	Medium	15	Closest sensitive receptor between 20 and 100m from kitchen discharge
	Far	10	Closest sensitive receptor more than 100m from kitchen discharge
Size of kitchen	Large	20	More than 100 covers or large sized take away
	Medium	15	Between 30 and 100 covers or medium sized take-away.
	Small	10	Less than 30 covers or small take away.
Cooking type (odour and grease loading)	Very High	20	Pub (high level of fried food), fried chicken, burgers or fish & chips.
	High	15	Kebab, Vietnamese, Thai or Indian.
	Medium	10	Cantonese, Japanese or Chinese.
	Low	5	Most pubs, Italian, French, Pizza or steakhouse.

** Sensitive receptors are classified as residential properties around the site. There are no sensitive receptors around the vicinity of the site.*

Scoring

Unit	Dispersion	Proximity to Receptors	Size of Kitchen*	Cooking Type+	Total Score
Kitchen	Good, 5	Fair, 10	Small, 10	Low, 5	20, Low risk

Notes;

** Size of kitchen is currently based on the restaurant distribution detailed within the Benoy general arrangement drawings provided as part of this planning submission.*

+ Cooking type is expected to be chain restaurant (A3 classification) and NOT take-away style of food provision (A5 classification).

Odour Control Equipment

Based on the risk assessment completed above and following the guidance within the document for a score of low risk, low level odour control is required and it is proposed to achieve this via the cooking hood unit and good discharge velocities at the roof of the building.

3.3 Ground floor public and staff toilet mechanical extract ventilation system

A ground floor public and staff toilet mechanical extract fan system shall be provided. The system shall comprise of a packaged twin (run and stand-by configuration) fan unit to be located in the waste store of the building. A ductwork distribution system shall be routed through the building to extract air grilles.

The system shall be provided with acoustic control to comply with the acoustic requirements of the project.

The mechanical extract system shall be constant volume.

The extract fan unit shall be controlled via light switch or PIR operation and shall be provided with an adjustable run-on timer control (initial operation set to 20mins).

Supply air shall be via natural means from adjacent spaces. Under cutting the doors or door transfer grilles shall be provided through doors to rooms fitted with mechanical extract ventilation.

The fan unit is located on the ground floor discharging to atmosphere at a high level louvre.

3.4 Water tank room mechanical supply and extract ventilation

A water tank room mechanical supply extract wall fan system shall be provided. The system shall comprise of supply an extract wall fans in the tank room wall.

The system shall be provided with acoustic control to comply with the acoustic requirements of the project.

The system shall be constant volume and run continuously 24hrs/7days per week.

The fan units shall draw in air from the plantroom and discharge air back to the plantroom to ensure good air change rate in the separate room.

3.5 Boiler room mechanical extract ventilation system

A boiler room mechanical supply and extract fan system shall be installed to provide the plantroom with the required air change rate to meet temperature and ventilation requirements as well as adequately provide for the boiler combustion air requirements. Each of the supply and extract fan systems shall comprise of a packaged twin (run and stand-by configuration) fan unit to be located at high level in the basement plantroom. Ductwork distribution systems shall be routed from the plantroom to rise to louvres on the ground floor. The extract and intake shall be fitted with insect mesh.

The system shall be provided with acoustic control to comply with the acoustic requirements of the project.

The mechanical extract system shall be constant volume and run continuously 24hrs/7days per week.

The ventilation system shall be interlocked with the operation of the boilers. i.e. the boilers will not fire unless there is a proven air flow into the room.

The extract fan speeds shall be controlled and adjusted by the BMCS to modulate depending on the number of boiler modules firing so as to maintain a balanced vent system.

The supply fans shall draw in fresh air from a louvre at high level on the ground floor external façade and the exhaust air shall discharge from a louvre at high level on the ground floor external façade also, with louvres separated to prevent recirculation of air flows.

3.6 HV/LV switch room mechanical extract ventilation system

A HV/LV switch room mechanical extract fan system shall be provided. The system shall comprise of a wall fan unit located in the plantroom area.

The system shall be provided with acoustic control to comply with the acoustic requirements of the project.

The mechanical extract system shall be constant volume and run continuously 24hrs/7days per week.

Louvred doors opening to plantroom shall be provided as a make-up air path. The mechanical extract ventilation system shall be sized to include for pressure losses associated with the louvred doors and room.

4. Flues

The development will be provided with a number of flues, namely;

Hotel heating boiler flue

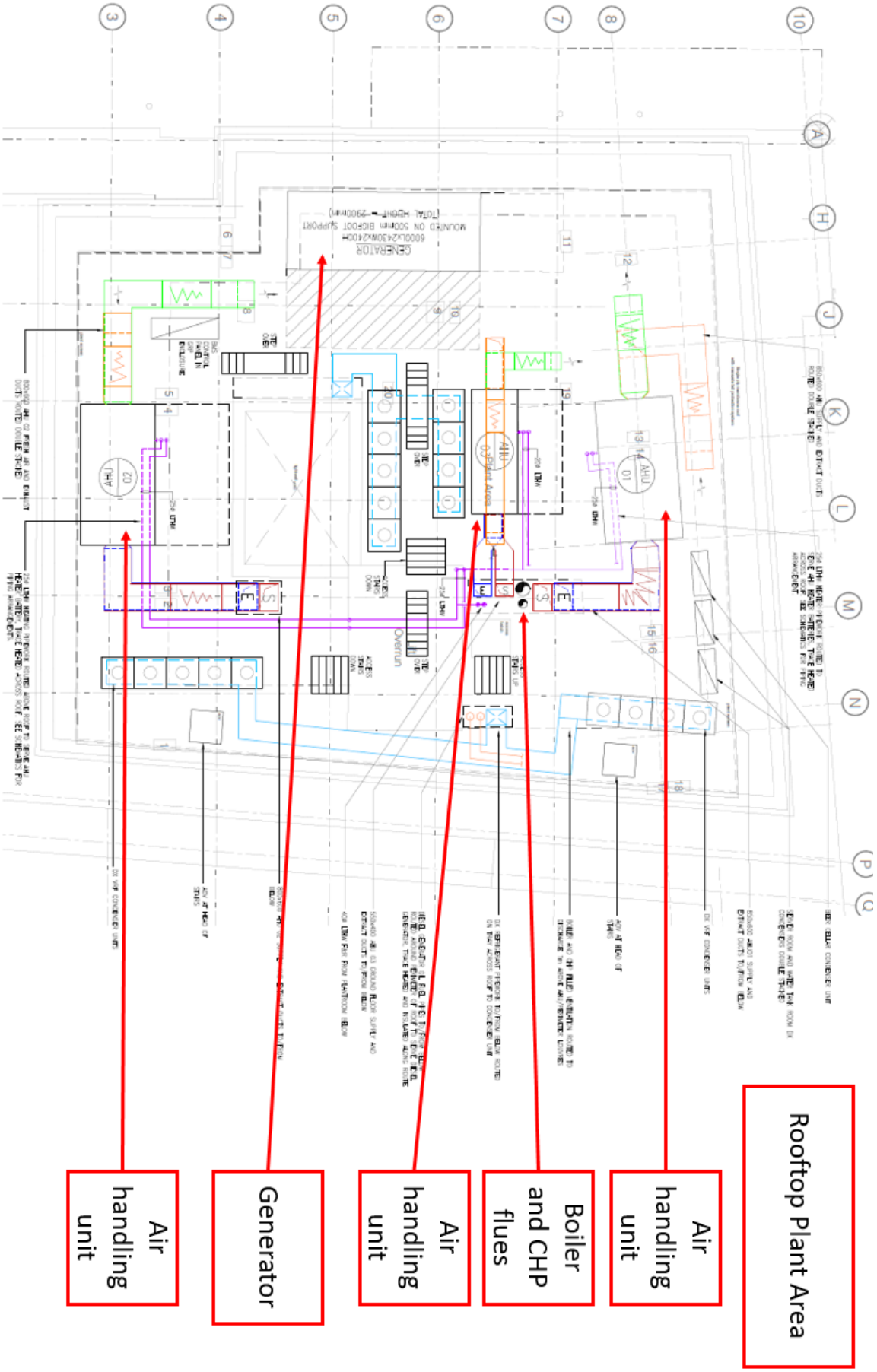
Hotel essential service generator flue

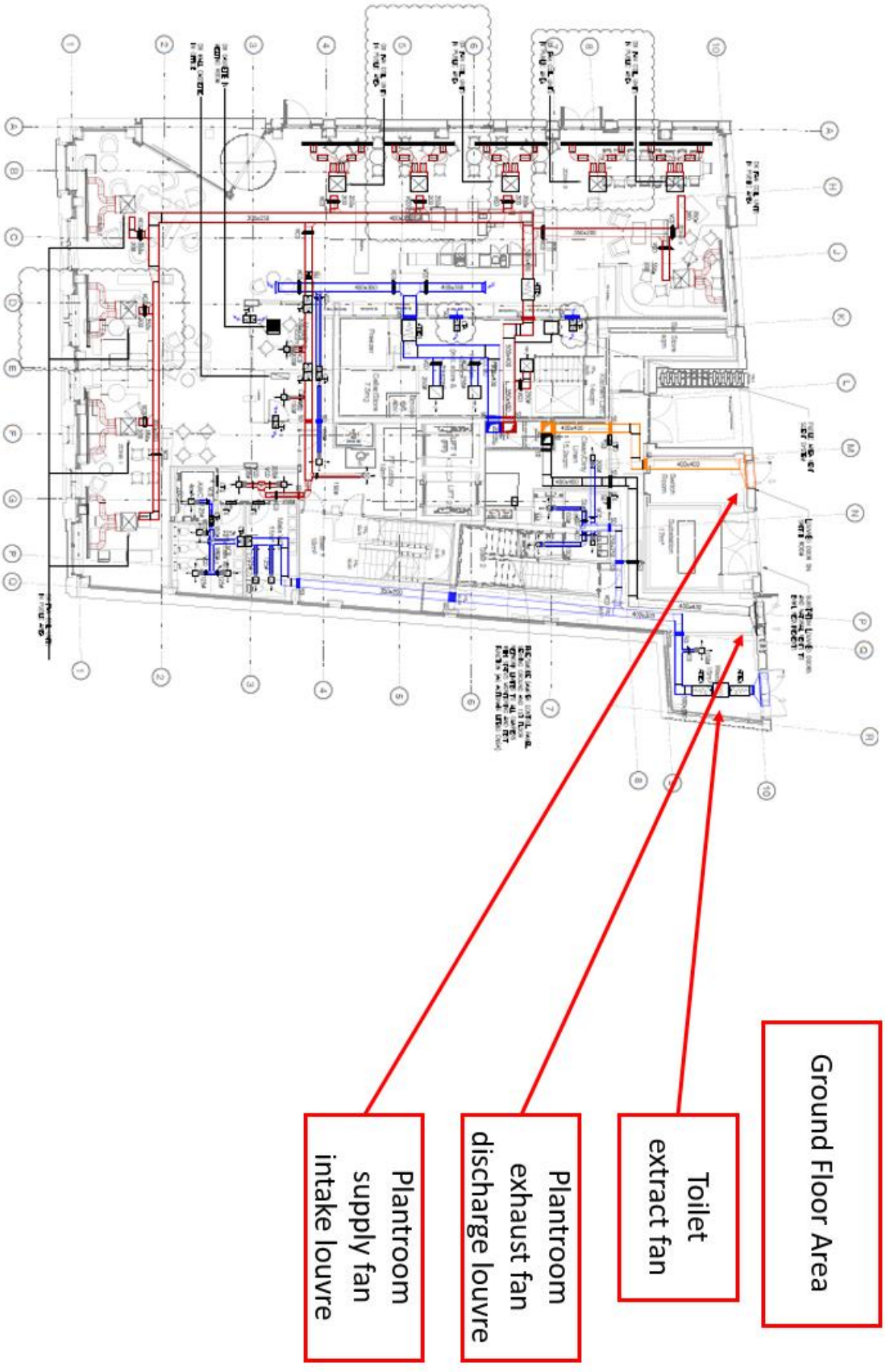
Hotel CHP unit flue

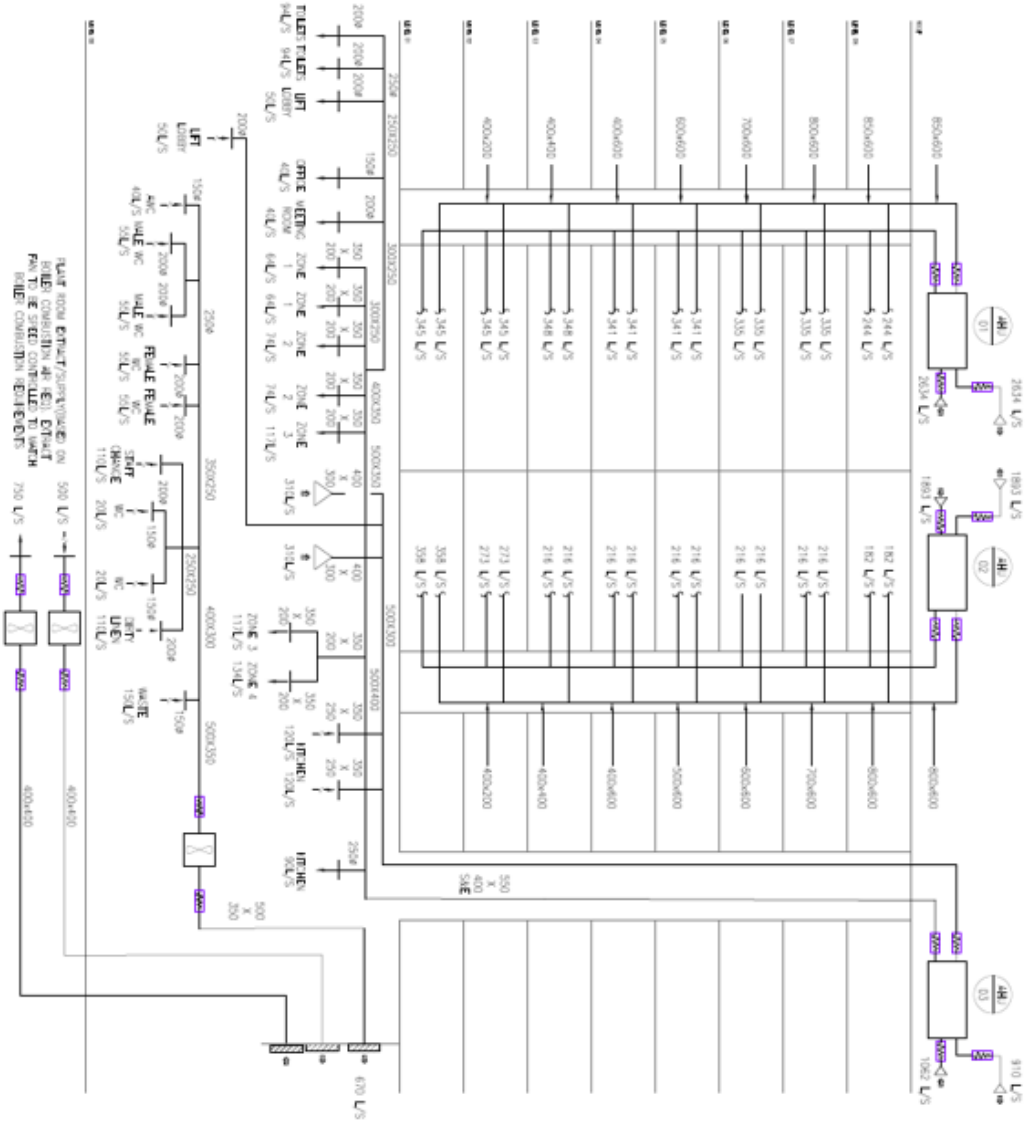
Flues shall be routed through the building into risers. Flues shall extend through the risers to roof level whereby they shall discharge to atmosphere 1m above the highest proposed building roof level in accordance with the requirements of the Clean Air Act 1953 and as amended in 1993.

5. Plant Locations

The following annotated drawings show the vent system locations within the building.


Air handling unit
Generator
Air handling unit
Boiler and CHP flues
Air handling unit
Rooftop Plant Area


Ground Floor Area
Toilet extract fan
Plantroom exhaust fan discharge louvre
Plantroom supply fan intake louvre



Ventilation Schematic