Condition 13 of the planning application;

Installation of Extraction Ventilation System to the Extension of the roof.

1. Introduction

This document provides a detailed specification for the installation of an mechanical extraction ventilation system in a place toilet facility consisting of Cubicles, Washing facilities and classrooms. The system is designed to ensure adequate air quality, odour control, and compliance with relevant building standards. All extraction fan units will be inline tube fans mounted on the ceiling and walls to minimize noise and aesthetic impact within the facility. This specification is intended for submission to the local council for approval and assumes adherence to standards such as ASHRAE 62.1 for ventilation rates.

The system will provide negative pressure in the toilet area, extracting stale air, fumes and odours while allowing makeup air to enter via transfer grilles or undercuts in doors. The total exhaust capacity is calculated based on the number of fixtures to meet or exceed minimum requirements.

2. Design Basis and Calculations

2.1 Ventilation Requirements (Fumes and Gases)

Public toilet facilities require mechanical exhaust ventilation to maintain indoor air quality. According to ASHRAE standards, the minimum exhaust rate for toilet rooms is 50 cubic feet per minute (CFM) per water closet or urinal (Wet Washing Areas) for light-use areas, increasing to 70 CFM for heavy-use scenarios such as in commercial or public spaces. Some guidelines suggest 8-12 air changes per hour (ACH) for commercial restrooms. Alternative criteria include 2 CFM per square foot of floor area, 10 ACH, or up to 100 CFM per fixture for optimal performance.

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For this facility: per location/Room

- Number of water closets: 7
- Number of urinals (Wet Washing Areas).

2.2 System Type

- **Extraction Method**: Mechanical exhaust using inline tube fans.
- **Fan Location**: All fans mounted externally on the roof to reduce indoor noise and facilitate maintenance.
- **Ducting**: Rigid or flexible ducts routed from ceiling grilles in each cubicle/urinal (Wet

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Washing Areas)/Rooms to the ceiling-mounted fans.

- **Makeup Air**: Provided passively via door undercuts, transfer grilles from adjacent spaces, or dedicated intakes to avoid back drafting.

3. System Components

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3.1 Fans

- **Type**: Inline tube fans (centrifugal or axial)
- **Specifications**:
  - Voltage: 220-240V single-phase.
  - Noise Level: <50 dB at 3m to minimize disturbance.
  - Material: Corrosion-resistant (e.g., galvanized steel or plastic for humid environments).
  - Features: Backdraft dampers, variable speed controls for energy efficiency, and weatherproof roof cowls.
- **Mounting**: Roof-mounted with vibration isolators and flashing for weather sealing.

3.2 Ductwork (Refurbished Area)

- **Material**: Galvanized steel and Flex
- **Routing**: Vertical risers from ceiling to roof, with fire-rated penetrations if passing through floors.

3.3 Grilles and Vents

- **Extraction Points**: One exhaust grille per cubicle (above the water closet) and one per wet washing Areas, and one ceiling grill per room in class rooms/kitchen (Flow and Return) naturally.
- **Type**: Ceiling-mounted air valves.
- **Roof Termination**: Weatherproof cowls or gooseneck vents to prevent rainwater ingress.

3.4 Controls and Accessories

- **Controls**: Timer switches, occupancy sensors, or constant run for continuous ventilation in high-use areas.
- **Power Supply**: Dedicated circuit with GFCI protection.

4. Installation Procedure

1. **Site Survey**: Assess roof structure for fan mounting, measure room dimensions, and confirm fixture locations.
2. **Duct Installation**: Install branch ducts from grilles to a central manifold, then vertical riser to roof.
3. **Fan Mounting**: Secure inline tube fans on roof curbs or platforms, connect to duct ends.
4. **Electrical Wiring**: Connect fans to power supply with controls.
5. **Testing**: Commission system to verify airflow rates (using anemometer), balance dampers, and ensure no leaks.
6. **Compliance Check**: Measure total exhaust and confirm ACH via room volume calculation.

Installation must be performed by qualified HVAC contractors, with all work complying with local electrical and building codes.

5. Compliance and Standards

- **Ventilation Standards**: ASHRAE 62.1-2019 for exhaust requirements.
- **Building Codes**: Refer to local regulations (e.g., NBC 2020 for 50 CFM intermittent or 20 CFM continuous per fixture). System designed to exceed minimums for safety.
- **Energy Efficiency**: Fans selected for low energy use, potentially qualifying for green building
- **Maintenance**: Annual inspections recommended to clean ducts

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