

**Brookleigh Eastern Primary School,
Brookleigh, Burgess Hill**

Reserved Matters Application

Ventilation and Extraction Assessment

Client



**Homes
England**

Project No

DARTS-OTH-88

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CampbellReith

Multidisciplinary Consultants



HOMES ENGLAND

BROOKLEIGH EASTERN PRIMARY SCHOOL, BROOKLEIGH, BURGESS HILL

VENTILATION AND EXTRACTION STATEMENT

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VERSION CONTROL

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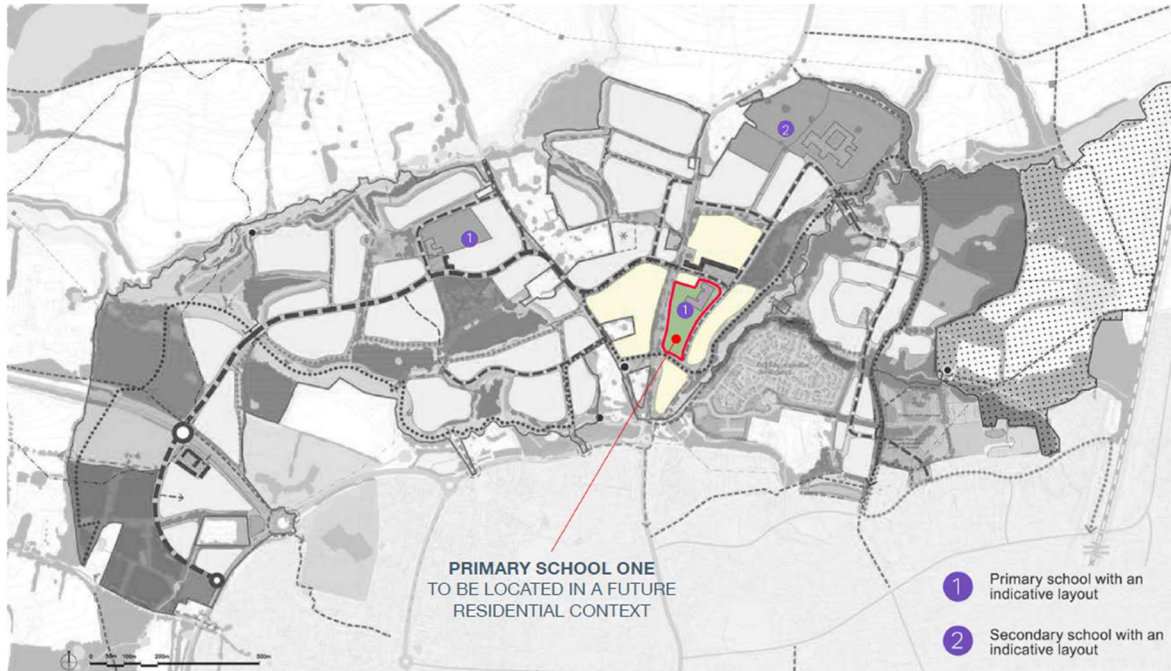
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1.0 INTRODUCTION

On behalf of Homes England, FLOH Consulting Ltd. has been appointed to prepare this Ventilation and Extraction Statement to support a reserved matters application for a new two form entry primary school for around 420 pupils at the Burgess Hill Brookleigh (formerly known as Northern Arc) mixed use development in West Sussex.

Figure 1.1: Overview of wider Brookleigh development (Northern Arc Design Guide)



1.1 Description of development

Reserved matters application to consider access, appearance, landscaping, layout and scale pursuant to application DM/21/3279 (original reference DM/18/5114) for parcel P1.2 comprising of the construction of a primary school with nursery and special support centre, car parking, multi-use games area, playing fields, landscaping and associated infrastructure.

1.2 Background

At RIBA Stage 1, FLOH undertook various analyses on energy, carbon and comfort and set out how the building might be serviced.

At RIBA Stage 3, commensurate with the accepted level of detail at RIBA Stage 2, further analysis and design development has been undertaken to refine performance and approach, to ensure emerging proposals meet the required performance standard, or to develop alternative approaches where they do not.

1.3 Aims and objectives

Primarily, this document sets out to: -

- Provide an overview of the proposed ventilation strategy
- Identify location and configuration of proposed equipment and associated terminals
- Consider acoustic mitigation measures as applicable.

1.4 Terms of reference

Are included as footnotes within the body of the document.

1.5 Glossary of terms

AHU	Air handling unit
AQ	Air quality
ASHP	Air Source Heat Pump
FLOH	FLOH Consulting Limited
GSHP	Ground Source Heat Pump
MVHR	Mechanical ventilation, heat recovery
PV	Photovoltaic

1.6 Limitations

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The output of this document does not provide a proposal that could be adopted without further investigation and detailed design.

Any costs provided are budget comparative costs and exclude professional fees, statutory charges and VAT.

All parts are based on other design information available just prior to publication.

2.0 REQUIREMENTS AND DRIVERS

Relevant design standards are described below.

2.1 Building Regulations Part F¹

Requirement F1(1), from Approved Document Part F (ADF) states:

- *“There shall be adequate means of ventilation provided for people in the building.”*

ADF makes no provision for ventilation with the specific aim of controlling or reducing the risk of summertime overheating in schools and instead refers to BB101².

2.2 Building Bulletin BB101

Building Bulletin 101 (BB101) provides guidance on ventilation, thermal comfort and indoor air quality in schools. It defines compliance requirements as:

- *“(DfE performance standards for teaching and learning spaces) must be followed if a school building is to comply with BB101.”*
- *“The designer should carry out an Overheating Risk Assessment (ORA) of free running designs by following the procedure set out in CIBSE TM52³.”*

2.3 DfE Air quality standards

In addition to the general ventilation requirements of ADF, the DfE has set the following performance standards for teaching and learning spaces which ensure compliance with the Workplace Regulations.

In teaching and learning spaces served by mechanical ventilation:

- Sufficient outdoor air should be provided to achieve a daily average concentration of carbon dioxide (CO₂) of less than 1000 ppm, during the occupied period, when the number of room occupants is equal to, or less than the design occupancy.
- The maximum concentration should also not exceed 1500 ppm for more than 20 consecutive minutes each day when the number of room occupants is equal to, or less than the design occupancy.

In naturally ventilated teaching and learning spaces:

- Sufficient outdoor air should be provided to achieve a daily average concentration of CO₂ of less than 1500 ppm, during the occupied period, when the number of room occupants is equal to, or less than the design occupancy.
- The maximum concentration should also not exceed 2000 ppm for more than 20 consecutive minutes each day, when the number of room occupants is equal to, or less than the design occupancy.
- Systems should be designed to achieve a carbon dioxide level for the majority of the time of less than:
 - 1200ppm (800ppm above outside air level) for a new building for the majority of the occupied time during the year.
 - 1750ppm for a refurbished building (1350ppm above outside air level) for the majority of the occupied time during the year.

¹ Approved Document F: Ventilation, Volume 2: Buildings other than dwellings, 2021 Edition

² Building Bulletin 101, Guidelines on ventilation, thermal comfort and indoor air quality in schools, Version 1, August 2018, Education & Skills Funding Agency,

³ CIBSE TM52: The Limits of Thermal Comfort: Avoiding Overheating in European Buildings, CIBSE, 2013

Ventilation systems should be designed to maintain CO₂ levels based on the maximum number of occupants the space accommodates.

In teaching and learning spaces, in the absence of any other major pollutants, carbon dioxide is the key indicator of ventilation performance for the control of indoor air quality.

3.0 PROPOSED STRATEGY

3.1 Overview

Wherever possible natural ventilation will be used, but in most parts mixed mode approaches have proven necessary.

3.1.1 Teaching spaces

Teaching spaces will be naturally ventilated with assisted stack extract. Automated acoustic louvres will be used for fresh air inlet and will be coupled with a high level extract fan which will exhaust via a dedicated stack for each teaching space.

SEN spaces will additionally have mechanical ventilation with heat recovery, comprising units at high level, terminating at facades.

Extract will also be provided from the Food science / DT technology classroom.

3.1.2 Main hall

Passive ventilation using low level inlets via earth tubes and high level exhaust via clerestory glazing will be used in the main hall and auditorium.

3.1.3 Staff areas

General staff areas will adopt natural ventilation via openable windows where they are on external walls.

Internal occupied spaces will be mechanically ventilated using local or zonal heat recovery ventilation systems. Smaller heat recovery units will be located within ceiling voids over secondary (stores, toilets) or transient spaces, and larger units in the roof well at first floor.

External terminals will be at high level, suitably spaced and integrated into façade arrangements.

3.1.4 Kitchen

A commercial ventilation system will be provided to the main kitchen.

Plant will comprise separate supply and extract fans, located at first floor over the kitchen itself. Supply fan will have a low level intake via the louvred wall of the plant compound and the extract fan a high level exhaust at roof level.

Heat recovery is not proposed to this system.

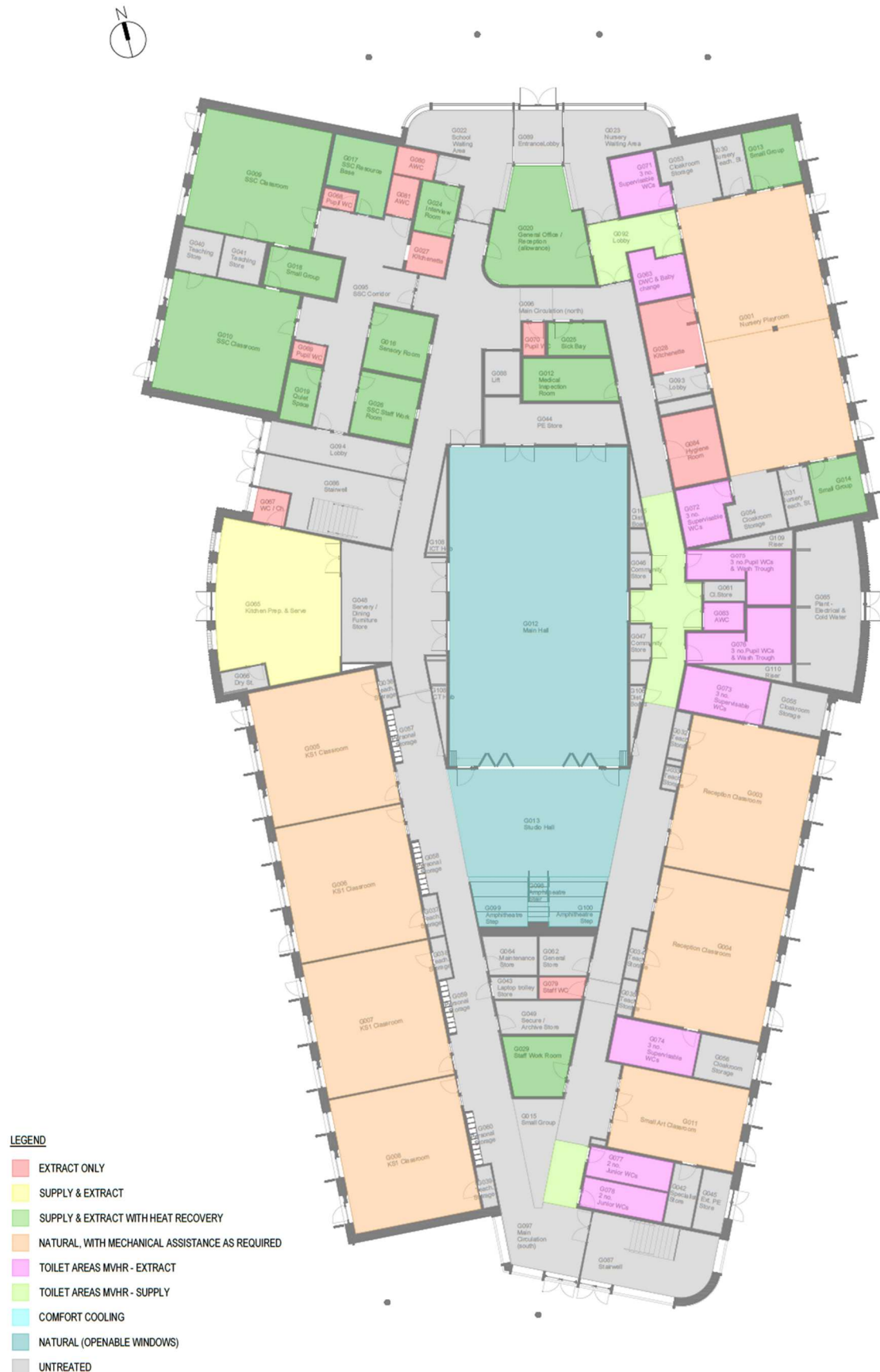
3.1.5 Sanitary accommodation

Remote sanitary accommodation or any process spaces will have local extract only ventilation comprising in line fans typically located in ceiling voids over secondary or transient spaces. External terminals will be at high level, suitably spaced and integrated into façade arrangements.

3.2 Environmental treatment plans

Environmental treatment plans (ETPs) presented overleaf indicate the means of ventilation to each of the spaces.

Figure 3-1: Environmental treatment plan, ground floor (N.T.S.)



3.3 Ventilation services configuration

Proposed mechanical ventilation services are either common, serving clusters of similar spaces in proximity to one another, or local, serving just a single space. Such an approach enables systems serving different parts of the building to operate independently at times to suit use.

Further, absence of a central system, one which serves a number of different spaces throughout the building, obviates the need for major plant space, extensive distribution and complex controls and reduces the risk of nuisance noise and vibration from equipment.

3.4 Noise and vibration

Selection of mechanical equipment will be informed by acoustic performance and will be vibrationally isolated from the structure, with particular attention given near teaching spaces and staff areas.

Matched attenuators will be proposed to all mechanical ventilation equipment to mitigate risk of in duct noise break out.

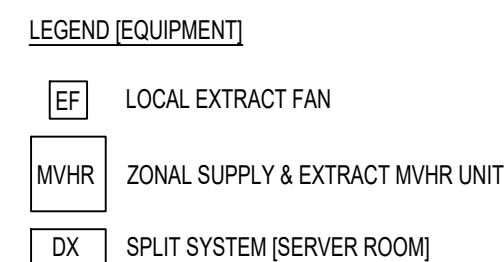
Terminal positions will also be considered to ensure nuisance noise at facades is avoided.

3.5 Drawn information

Drawn information indicating equipment locations and terminal positions is provided in appendix A.



APPENDIX A – EMERGING STRATEGY LAYOUT DRAWING





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