



**Concept Planning Report for
STROUDS**

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BSE3D QA SYSTEM

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1.0 INTRODUCTION

BSE3D Consulting Engineers have been appointed by Mr & Mrs McGahan to provide Mechanical, Electrical and Public Health advice for the design of a major refurbishment of their house. The property address is Strouds, Church Lane, Horsted Keynes, West Sussex, RH17 7AY. The property is Grade II listed.

The existing property comprises two distinct building elements with differing ages, construction types and services infrastructure. The West building is an early 17th-century structure with inherently low insulation levels, single glazing and restricted floor-to-ceiling heights. Heating is currently delivered via radiators connected to a wall-hung LPG boiler, which also supplies a first-floor hot water storage tank.

The East building, formed through extensions in the 1960s and 1980s, is also single-glazed and poorly insulated. Space heating is provided by electric panel heaters, and hot water is derived from a mixture of local electric appliances and connections back to the West building's hot water tank.

The refurbishment aims to bring the East building into full family use, improving comfort for young children and unifying the heating and hot water systems across the entire property. MEP interventions therefore focus on enhancing thermal comfort, consolidating heat generation and distribution, and improving long-term operational flexibility. The total floor area of the existing building is 263m², with major refurbishment works concerning approximately 130m² of floor area.

2.0 HEATING SYSTEM

The proposed works seek to create a fully unified heating system across both the East and West buildings, with a forward-thinking approach that allows future compatibility with heat pump technology.

The details of the strategy are set out below in writing. Please see enclosed MEP strategy drawings for Ground Floor and First Floor for spatial arrangements.

2.1 EAST BUILDING & ENTRANCE HALL

Underfloor heating (UFH) is proposed for the ground floor and Entrance Hall areas. Supplementary radiators will be installed at ground floor level to account for the lower insulation levels characteristic of older structures. A new multi-fuel stove is planned for the kitchen as a secondary heat source. The ground floor shower room will receive UFH, supported by electric heating owing to its compact size.

Routing of new heating pipework to connect from the boiler position to the East building will be installed at high level, coordinated to fit within a ceiling void preferably. If this is not spatially viable, pipework will be installed within a neat boxing detail in a similar fashion to the existing boxing detail for the electrical consumer unit in the Entrance Hall.

New radiators are proposed for the first floor. The existing first-floor bathroom will be heated electrically due to spatial constraints preventing alternative solutions.

2.2 WEST BUILDING

Existing radiators will remain in place, with consideration given to upgrading them where thermal calculations demonstrate a need.

2.3 OPERATING TEMPERATURES

All new heating emitters in the East building and Entrance Hall will be designed to operate at 55°C. This approach supports future ease of integration with heat pump systems.

The West building radiators will be balanced and controlled to run at the lowest viable system temperature that still fulfils heating demand.

2.4 CONTROLS

A new unified heating control system will be provided, incorporating the following features:

- Control valves and control logic for 2 heating zones; East building and West building. In addition there is 1 heating circuit dedicated to Hot Water production.
- Wireless thermostatic radiator valve (TRV) control to all radiators in the East building and West building.
- Full integration of UFH circuit controls into central control system
- Optimised management of hot water production
- Direct interfacing with the new condensing LPG boiler to maximise efficiency.
- Time and temperature control
- Weather compensation
- Remote control and monitoring of heating via mobile app, dependant on product selected.

2.5 HEAT SOURCE

A heat pump was considered for the project but discounted based on several constraints:

- The age and limited insulation of the building fabric make it unlikely that a low-temperature system could satisfy the full heating load.
- The building's listed status introduces sensitivities around the visual and physical impact of an external heat pump installation.

Accordingly, the strategy is to replace the existing LPG boiler with an appropriately sized LPG boiler, positioned in the same location as the current appliance. A repurposed plant room will house the boiler alongside the upgraded heating and hot water infrastructure. This approach ensures continuity of appearance while providing reliable sizing to meet whole-house thermal demand.

A suitable boiler selection for the replacement heat source would be an Ideal Heating Logic Max System² with a 30kW heating capacity and LPG conversion kit. This boiler can operate with control systems, including those operating with the OpenTherm control protocol.

3.0 VENTILATION

The proposed works require minor alterations to the ventilation provision in the property to provide adequate ventilation in re-planned spaces.

3.1 VENTILATION STRATEGY

Natural ventilation is retained as the primary ventilation strategy for the house, with intermittent mechanical extract ventilation for bathrooms, utility rooms and kitchen.

The first floor bathroom in the East building is presently naturally ventilated via opening windows, and this will be retained in accordance with building regulations Part F Volume 1 paragraphs 3.30 to 3.32.

3.2 MECHANICAL VENTILATION

New fans are required as follows

- Extract fan for new utility room in the West building, 30l/s
- Extract fan for new shower room in the East building, 15l/s
- Extract fan for new kitchen in the East building, 60l/s. The ventilation rate selected meets building regulation requirements and allows freedom over kitchen layout design.

4.0 DOMESTIC WATER

Significant improvements are proposed to modernise the property's cold and hot water systems and to ensure consistent pressure, flow and reliability.

4.1 COLD WATER

A new cold-water booster set will be installed to overcome the historical issue of low mains pressure and to support a pressurised domestic hot water (DHW) system. This installation is most likely to be undertaken within the redesigned utility room in the West building.

4.2 HOT WATER

A new indirect, unvented, hot water cylinder will be positioned adjacent to the new boiler, sized to meet the full hot water requirements of both buildings. The new hot water cylinder will have a capacity of at least 300 litres.

4.3 PIPEWORK

New hot and cold water distribution pipework will be installed to unify supply across the East and West buildings. The existing first floor hot water tank in the West building will be removed.

5.0 SANITATION

The re-planning works make use of existing stack positions in all locations, so that little or no changes are required to main stacks and below ground drainage.

The re-planned utility space in the West building will make use of the stack position(s) of the existing kitchen.

The re-planned plantroom space in the West building will make use of the stack position(s) of the existing WC.

The re-planned ground floor shower room in the East building will make use of the stack position(s) of the existing utility room.

The re-planned kitchen in the East building will require a new drainage stack. This stack will be ventilated either using an air admittance valve, or a connection to the existing stack adjacent to the first floor bathroom dormer. Neither approach will visually impact the external roof or façade.

6.0 ELECTRICAL

The changes envisaged do not have any items with a major electrical load. The re-planning works are not anticipated to significantly affect the existing electrical infrastructure.

6.1 EXISTING CONSUMER UNIT

The existing consumer unit is in the Entrance Hall on the East wall at high level.

6.2 ELECTRICAL CABLE ROUTES

Cable routes are not known at this time, as only a brief visual inspection of the property has been carried out. The main area of attention regarding cable routes is the reconfiguration of the Entrance Hall roof, as this will likely contain the cable routes from the consumer units to the West building. This area will require attention at the next design stage.

6.3 CHANGES AFFECTING ELECTRICAL LOAD

The East building has electric panel heaters in each room, and an electric directly heated hot water cylinder of 150 litre capacity. There is an electric towel rail in the first floor bathroom.

All panel heaters will be removed as part of the works. The electric hot water cylinder will be removed. The existing electric towel rail will either be retained or replaced with a similar product.

A cold water booster set will be added into the re-planned utility room in the West building.

6.4 ELECTRICAL WORKS

New sockets will be required throughout the refurbished East building. Power supplies will be required to new fans, manifold, control points, kitchen units.

New luminaires, power wiring and switch wiring will be required throughout the refurbished East building.

6.5 FIRE ALARM

The requirements for the fire alarm system have not been developed at this stage, as enquiries have not been made to determine if the major refurbishment works in the East building would trigger the requirement of fire alarm upgrades in the West building. This set of requirements will be developed at the next design stage.

For budgeting purposes an allowance should be made for a Grade D2 LD2 fire alarm for the whole house in accordance with building regulations Approved Document B Volume 1 (2019).

