TECHNICAL DESIGN NOTE

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Project name	Kingsmead Secondary School		
Design note title	Sustainability summary and update		
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1. INTRODUCTION

This Note has been prepared to respond to comments received during the consultation process for the current application at Kingsmead School. The purpose of this note is to summarise the existing sustainability features of the design and to set out a number of enhanced measures that are now being proposed.

2. HOW DOES THE DESIGN OF THE BUILDING PROMOTE SUSTAINABLE DEVELOPMENT?

The proposed Kingsmead Academy building is designed to high standards for limiting energy consumption and carbon dioxide production. This ethos extends throughout the design to ensure that the lighting, heating and ventilation of the building is based on non-wasteful, simple systems with simple controls to ensure that the building requires the minimum levels of energy input to run efficiently.

The environmental services strategies have also been developed to meet the requirements of Kingsmead Academy whilst ensuring the solutions have been developed in line with the requirements of the school specific brief and the DfE General Design Brief (GDB) criteria.

The scheme has been designed to comply with and exceed current Building Regulation standards, including Approved Document Part L that provides guidance on the conservation of fuel and power. As evidenced in the Part L report submitted in support of this application, the building design exceeds given Part L requirements.

The building environmental strategy aims to minimise energy usage, via the use of passive design measures, such as building thermal performance, low air permeability, optimising the extent of external glazing to maximise day lighting without giving rise to excessive heat gains.

The architects have adopted a fabric first approach to designing the building in a sustainable manner, meaning that the ecological benefits are designed into the building fabric and construction from the outset. The design of external wall and roof build ups has included additional insulation to enhance thermal mass and we have payed particular attention to the construction details of the building, ensuring that the air tightness of the building exceeds building regulations and minimises heat loss. The

buildings are zoned in terms of services, so if a space is unoccupied, the services for example lighting & heating, can be turned off to conserve energy.

The Main Teaching block is orientated such that most of the teaching spaces benefit from optimal daylight with natural ventilation options to each. It also has the additional benefit of being of concrete frame construction which allows for a greater thermal mass and retention of heating and cooling to maintain an optimal comfort temperature again minimising energy usage where possible.

The Activity Studio and the Main Hall are orientated to be north facing to prevent overheating when the space is in use.

3. HOW ARE ENERGY AND RENEWABLES ADDRESSED?

The approach to ensuring a low energy and sustainable design utilises a fabric first approach. With close collaborative working between the Architects and Engineers the proposals are for a building which is inherently energy efficient and gives a low regulated carbon emission rating.

As a first step, the approach is to adopt a largely passive design which involves designing to reduce the energy consumption from the outset. The performance of this is demonstrated via assessment of the building against the building regulations Part L. The building design has been calculated to improve on the requirements of the building regulations without the application of any renewable energy technologies.

The elements of the building that have been specified with performance levels which exceed the building regulations include the following

- improved external wall insulation (proposed 0.17 W/m2K against regulation figure of 0.26 W/m2k)
- solar control coatings to limit solar gains and potential overheating
- increased air permeability standards to reduce the need for heating and improving comfort. (proposed 4 m3/hr.m2 against regulation figure of 5 m3/hr/m2)

The building services design embraces low energy technologies and has been designed with a 'hybrid' ventilation approach. The building design maximises the use of natural ventilation for control of overheating (and avoidance of active cooling) and utilises low speed fan systems to introduce the correct levels of fresh air during winter. This system avoids unnecessary heating which is presented by uncontrolled ventilation through natural means.

Modelling has demonstrated compliance with BB101(2006) for thermal comfort and air quality.

The second step is to deliver the building's energy as efficiently and simply as possible, providing efficient building services and high-performance appliances including:

- Highly efficient LED lighting throughout with daylight dimming and absence controls;
- High efficiency gas boilers and water heaters;
- Demand-controlled ventilation where required;
- Building management and energy monitoring systems.

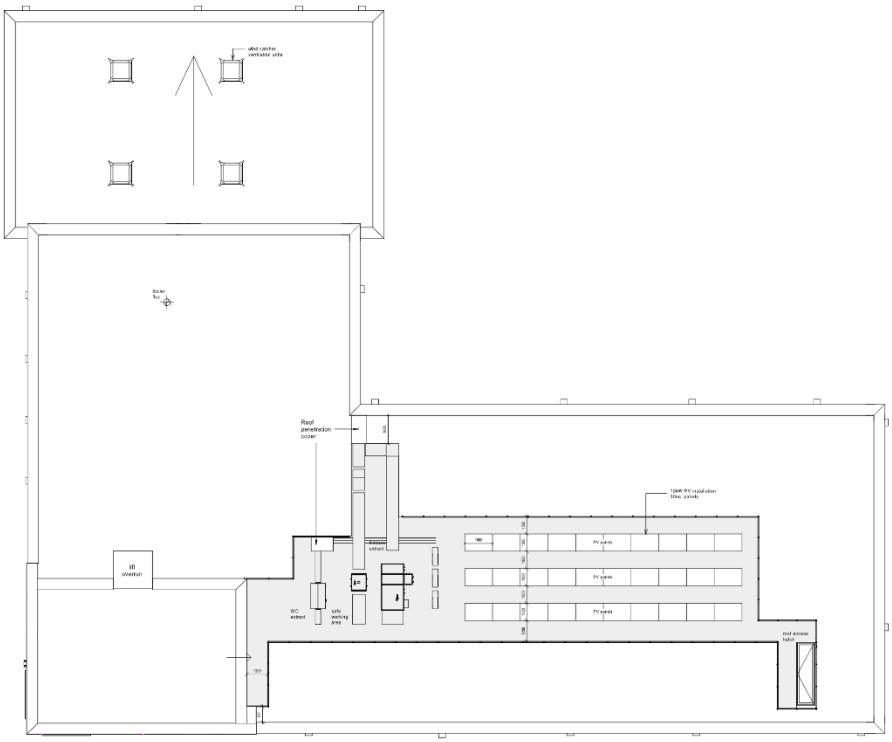
These measures are assessed in detail in the Part L assessment and are summarised below, which indicate the baseline energy performance of the both blocks complies and exceeds the required standards.

Target Emission Rating (TER) kgCO2/m2 annum	Building Emission Rating (BER) kgCO2/m2 annum	Compliance Margin
12.2	11.8	3.3%

The final step to ensuring a sustainable energy strategy, and an update to the proposals having listened to comments received during the planning application process, is the provision of renewable energy technologies to generate zero carbon energy for the development.

It is proposed that a 10kW photovoltaic system be installed on the roof of the new main building. This system is indicated on the plans below (with an updated Roof Plan and Section Plan submitted alongside this Technical Note). The arrangement of the array has been positioned to allow maximum effectiveness, avoid intrusive sight lines and be fully maintainable in a safe manner.

This system will connect into the school electrical distribution system and be used on site or can feed into the national grid when not utilised on site.



Excerpt from drawing 136639-AHR-B1-RF-GA-A-20000 P05.

4. WHAT OTHER SUSTAINABLE FEATURES ARE INCORPORATED?

The proposed surface water drainage system is designed to limit the surface water runoff generated by the developable hardstanding areas to, as close as reasonably practicable, greenfield runoff rates. This is achieved by utilising a static flow control device and underground storage tank to store runoff generated by storm return periods up to the 1 in 100 year event plus 40% allowance for climate change. This system provides a 50%

betterment to the existing surface water discharge rate from site, thereby significantly increasing capacity in the receiving downstream public sewer and significantly reducing flood risk to the wider locality.

To enhance the above water sustainability features of the design, source control sustainable urban drainage systems have also been incorporated into the drainage system upstream of the tank storage facility to provide amenity space for the school and water quality benefits. A rain garden has been provided adjacent to the refuse collection area which will receive runoff from the road turning head, highest risk area for hydrocarbon pollutants, and part of the new building roof. This source control system will naturally clean runoff through a filtration process and also retain any silts which would otherwise be passed onto the downstream public sewer. Further details are provided in the design response prepared by Craddys in response to comments made by the LLFA.

As well as improving the collection of rain water, this also integrates water sustainability into the curriculum, by providing a resource that can be used as part of the school curriculum. An example of a typical rain garden is shown below.