SOUTH YORKSHIRE FIRE & RESCUE SERVICE

Barnsley Fire Station

Energy & Sustainability Statement

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Rev 0

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Amendment Record Sheet

Revision	Description	Date	Approved
0	For comment	28/08/19	NB

Introduction

Silcock Leedham Consulting Engineers Ltd. have compiled the following sustainability for the new Barnsley Fire Station for South Yorkshire Fire & Rescue Service.

The development is located in Barnsley, South Yorkshire and therefore should meet the requirements of the Barnsley District Local Plan and shall achieve a BREEAM 'Very Good' rating.

This sustainability statement presents the outcome of the energy appraisal of the proposed development and details the approach that the applicant and the design team have collectively taken towards achieving a high standard of operational energy performance.

The statement outlines the features proposed to be incorporated into the design which aim to reduce the energy demand, energy consumption, resultant carbon dioxide emissions and therefore environmental impact of the scheme. In addition to demand reduction and energy efficient design the statement assesses the application of low or zero carbon technologies (LZCs) to the proposed development.

The Site

The development site is located in the town of Barnsley, South Yorkshire and is accessed from Broadway Road and is bounded by residential properties to the South and West with a large commercial unit to the East.

The development will involve the demolition of the existing fire station and shall be replaced by the construction of a new fire station incorporating three appliance bays and operational and welfare facilities to meet South Yorkshire Fire & Rescue Services requirements.

Planning Policy - Barnsley District Local Plan

The Barnsley District Local Plan was adopted by the Borough Council in January 2019 contributing towards the framework for local development until 2033. The Core Strategy sets out the vision for the Barnsley District and what the council aim to achieve over the period.

A number of the regional energy and sustainability requirements have been addressed through the following environmental appraisal.

The Model

Dynamic thermal modelling has been undertaken for the proposed development using Government-approved IES-VE software to determine the predicted energy demand and CO_2 emissions associated with the development.

Best practice has been followed in the development of the energy strategy to first reduce the demand for energy through passive fabric first measures and then utilise energy efficiency through high performance building services and effective control.

Thermal Envelope

- Thermal U-values

Space heating typically accounts for the largest proportion of regulated energy consumption. High levels of insulation will reduce boiler loads, running costs and help to maintain thermal comfort. Low U values will be targeted as part of the development proposals.

U values targeted for the development are:

Wall – 0.22 W/(m^2K)
Floor – 0.20 W/(m^2K)
Roof – 0.15 W/(m^2K)
Windows (inc. Rooflights) – 1.60 W/(m^2K)
Personnel Doors – 2.03 W/(m^2K)
Vehicle Access Doors – 1.50 W/(m^2K)

- Thermal Bridging (Psi-values)

In addition to achieving low U-values, minimising heat loss from thermal bridging is critical to ensuring that the Target Fabric Energy Efficiency (TFEE) is achieved. The rate of heat loss between adjacent building elements is represented by a 'Psi-value'.

- Air Permeability

Upon practical completion air tightness testing will be required. At this design stage an air permeability of 3 m3/h.m2 at 50 Pa is targeted.

- Embodied Carbon Dioxide

For the building elements the design team have the opportunity to select materials with low embodied energy. Using the Green Guide to Specification, the team will prioritise the selection of appropriate material.

Proposed Fixed building Services

- Space Heating

Ground and first floor levels will generally be heated via low pressure hot water fed from new high efficiency, low NOx, fully modulating, gas fired condensing boiler installation. Zonal control will be specified in conjunction with appropriate pipework infrastructure to ensure that heat is only directed where and when it is required.

- Space Cooling

Where space cooling is required, either for a specific process or overheating calculated through thermal modelling, this shall be provided by split system reverse cycle air source heat pump systems with high SCOP and SEER. The air source heat pump systems shall also provide the heating to these areas.

- Domestic Hot Water

An indirect hot water cylinder fed from the new high efficiency, low NOx, fully modulating, gas fired condensing boiler installation will provide the buildings hot water demand. All hot water pipework will be

insulated to reduce heat loss and to also help in mitigate the risk of summer time overheating.

- Natural Ventilation

Where possible natural ventilation will be provided to occupied spaces via opening. Local air quality sensors will be provided to give visual indication of the air quality and provide users with recommendations on when windows should be opened.

- Mechanical Ventilation

Where natural ventilation can't meet the ventilation requirements alone mechanical ventilation with heat recovery (MVHR) will be installed to provide efficient and filtered background ventilation to occupied areas. MVHR systems recover the heat from extracted stale air to pre-heat fresh supply air resulting in a net benefit in overall running costs. Local air quality sensors will be provided to automatically control the MVHR units based on carbon dioxide levels so that the units only run when required.

- Internal Lighting

All fixed internal light fittings will be low energy LED light sources controlled by presence or absence detection meaning lights will only be activated when required. In addition, where practicable lighting will be daylight linked to reduce artificial lighting when sufficient daylight exists.

Low Carbon Technologies

A desktop assessment of feasible renewable energy sources has been carried out and the results are detailed below. The renewable energy feasibility study for the proposed development assessed the use of wind turbines, solar thermal collectors, biomass boilers & photovoltaic modules.

Air source heat pumps have been provided to areas with a cooling requirement. Heat pump technology requires only a small amount of electricity to harvest, upgrade and move heat from one location to another and can provide both heating as well as cooling.

Due to the high efficiency of services and the low construction U values the building passes the minimum requirements set out in the Building Regulations Part L. As the project is under budget constraints, the additional capital cost outlay for providing any additional low carbon technologies has not been financially viable.