Design Statement

London Ashford (Lydd) Airport

Project:	LAL Airport
Architect:	R Johnson
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Sustainability Conditions

PB has been requested to provide evidence of the sustainability initiatives employed within the design of the terminal building. In response we would comment as follows:

The terminal has been designed with a number of sustainability objectives in mind. These are as described below.

Rainwater harvesting will be incorporated within the terminal design. The impact of this is the need for storage tanks for the grey water to be stored on site so that it is readily available for its identified uses (such as flushing toilets and watering landscaped areas).

The use of biomass is intended to be included within the terminal design as a backup to oil and to counterbalance pollution issues associated with oil. Biomass fuel in the form of woodchip or wood pellets can be used as a fuel for boilers. This fuel, if produced sustainably and locally and can be considered carbon-neutral - however the greenhouse gas emissions associated with its transportation must also be considered, and there is a need for a reliable source in the South East. A more detailed biomass feasibility study is required to establish the availability of biomass fuel sources local to Ashford, but anecdotal evidence is of an established biomass production market in Kent.

Natural ventilation has been ruled out from the terminal design as it is deemed counteractive to other sensitive issues, mainly being acoustics insulation and control of the building environment. As it conflicts with other issues, it has been dismissed from the terminal design. The following description provides an outline of the considered options for the mechanical ventilation and cooling systems within the terminal along.

Where mechanical ventilation is to be considered, a particular type is displacement ventilation. It has the following advantages and disadvantages:

The advantages associated with displacement ventilation include:

- Better indoor air quality than for conventional mixing systems – fresh air is introduced at low level and extracted at high level after picking up heat and contaminants produced by occupants or equipment in the space.
- Air is supplied into the room at higher temperatures and in lower quantities than for conventional mixing systems.
- Air is allowed to stratify over the height of the room, meaning that a higher return air temperature is achievable than for conventional mixing systems.
- Lends itself to use of ground source heat pump technology for cooling due to higher supply air temperature when compared to conventional mixing systems. If mechanical refrigeration is used the chiller can be set to achieve a better (Coefficient of Performance) CoP due to higher flow and return temperatures improving system efficiency and reducing electrical energy consumption
- The system is available for free cooling for a higher percentage of the year than for a conventional 'mixed' systems.

Heating, Ventilating and Air Conditioning (HVAC) and the plant necessary to support it, is to be included in the terminal design. The proposed system for most of the terminal building will be via a displacement system within the high volume areas. This will provide the most energy efficient system for delivering comfort conditions in the space. The offices and retail spaces will be served with fresh air from central, variable volume air handling plant along with chilled water and low temperature hot water connections also served from pumped variable volume circuits.

Utilisation of thermal mass effects shall be encouraged within the terminal building wherever permissible within the structural engineering design. This would be better utilised within the retail and office spaces. A co-ordinated approach will be taken to try and utilise the thermal mass of the building to reject heat throughout the un-occupied periods. The mass will be able to absorb heat gains during the occupied period, and then with using lower air volumes and electricity tariffs will be able to use the ventilation system to purge the spaces at night. This will assist with levelling out the temperature fluctuations within the space during the occupied period and will also allow for lesser capacity cooling systems to be utilised.

The primary heating medium will be produced from a combination of biomass boilers and oil fired boilers. The inclusion of ground source heat pumps in the terminal design is anticipated, however this cannot be confirmed until the ground conditions have been proved to be favourable. Favourable conditions consist of suitable aquifers below ground at a depth which is economically reachable, also, the presence of surface water that can be used as a heat sink/source for a heat pump.

The design of the mechanical and electrical services systems within the terminal building will be Building Regulations Part L compliant. This will ensure compliance with the five criteria. Full dynamic simulation of the proposed designs will be undertaken using BRE (Building Research Establishment) approved software. The purpose of this simulation is to ensure that the buildings carbon footprint is minimised and the necessary reduction in carbon emissions is achieved to comply with Part L2A.

The use of natural daylight has been incorporated into the terminal design in order to maximise available daylight where it is expedient to do, e.g. in public areas by incorporating transparent glazing panels in the wall and roof. Excessive heat gain in summer and heat loss in winter will have to be controlled, and such methods include, shading through external brise soleil (louvres).

The terminal has been designed with an adaptable layout, in order that the evolution of the terminal building from Phase I to Phase II may be achieved with the minimum of impact. The terminal has been designed as a steel framed building, that will be able to take the majority of the structural load during the construction of Phase II. By ensuring that adaptability is inherent within the terminal design, the terminal will continue to be as operational as possible during construction of Phase II.

The code for sustainable building seeks to provide a building design that conforms to best environmental practice. The code looks beyond the 2006 Part L requirements. Grant funding may be available for a range of renewable energy technologies such as wind power, solar hot water, photovoltaics as well as biomass. An option appraisal will be carried out during the development of the design to ascertain if any benefit can be gained over the lifetime of the building from renewable energy technologies.

Sustainable construction materials will be specified in accordance with BRE guidance (*Green Guide to Specification*), which includes specification of materials to be used within the project. The contractor is obligated to use materials specified, or those that are equal in the Green Guide.