

Environmental Credentials

The change in attitude towards energy and the environment, particularly as climate change effects become more evident and energy prices rise, has increased the demand for more sustainable buildings.

An environmentally-responsible approach has shaped the design of Butterfield. The park's Business Village will boast the first office buildings in the UK to incorporate an innovative ventilation system using earth ducts. The development will maintain a sense of scale and understated density appropriate to an out of town location. The buildings will be energy efficient whilst the landscaping will create an impressive and bio-diverse natural environment within which to work.

Energy Efficient Buildings

Energy efficient office buildings have benefits beyond that of saving energy and reducing CO2 emissions: they can lead to improved productivity and performance from the occupants thanks to better air quality and a more comfortable thermal environment.

Easter is striving to achieve a BREEAM "Excellent" standard for the buildings in Butterfield's Business Village as well as an "A" rating under the new European Energy Performance of Buildings Directive.

Butterfield's innovative passive heating and cooling ventilation system using earth ducts will reduce energy consumption by up to 75%, regulate air temperature and guarantee excellent air quality (see figure 1).

Lighting

Butterfield's Business Village will optimise natural light whilst minimising overheating due to direct sunlight through the orientation of the buildings; solar shading, in the form of automatic internal blinds; and strategic planting of deciduous trees to maximise shading.

The buildings will contain the highest quality energy efficient lighting installations, including glare compliant lighting and daylight dimming. Subsequently, lights will never be using more energy than is necessary to provide working illumination.

Biodiversity

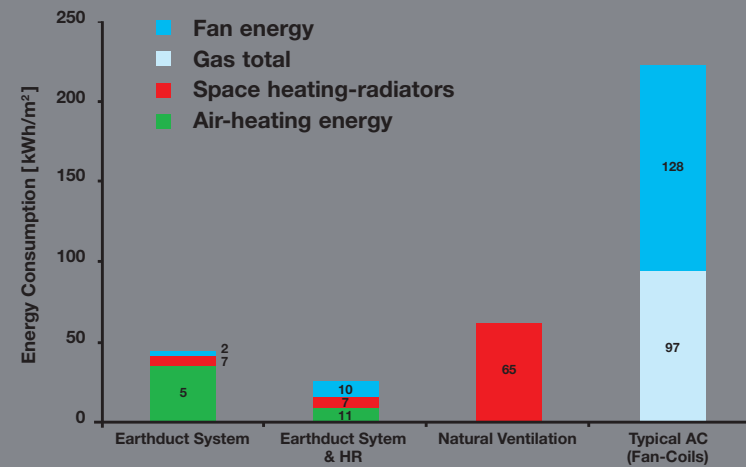
Biodiversity forms an integral part of Butterfield's careful masterplanning. An integrated landscape drainage system, with swales and balancing ponds, will help to manage surface water run-off, reduce peak flows and limit the risk of flooding whilst providing a more attractive environment and creating natural wildlife habitat areas.

Landscaping

Butterfield has been designed to fit around, maintain and enhance the existing mature hedgerows and areas of boundary woodland, each of which has specific associated wildlife. The landscape is designed to be natural in order to encourage a wide variety of species to flourish. Therefore, new planting will comprise wildflower meadows and grassed areas, with more formal ornamental planting close to buildings.

An extensive network of footpaths and cycleways will link offices with meadowland and ponds and offer a relaxing environment for workers.

Figure 1: Annual Energy Consumption (Heating and Ventilation) (excluding light and small power)



Did you know?

Buildings are major consumers of energy. Around 40% of final energy consumption in the European Community is in the buildings sector. Most of this energy is used for space heating. EC research has indicated that by improving energy efficiency, carbon emissions from buildings could be reduced by 22%. (Source: DEFRA website)

Earth Duct Ventilation System-The Science

In a naturally ventilated building, fresh air comes in through the windows—this air can be very cold in winter, requiring heating, and hot in summer, requiring cooling.

- 1 Butterfield’s earth duct system will draw fresh air into the buildings via raised intake grills in the landscape and through 80-metre long concrete pipes, or earth ducts, which will be buried below the buildings and landscape.
- 2 The earth ducts bring the incoming air into contact with the thermal mass of the earth which provides “free” preheating in the winter and cooling in the summer, thus maintaining a more steady air temperature supply to the building (see figure 2). In the summer, the earth will cool the air before it is introduced to the building. In the winter, the cold air will be warmed by the ground before passing over a small heating panel fed from the boiler to bring the air up to room temperature on very cold days.
- 3 Air will be filtered to remove particles, heated and blown into the floor void and discharged into the office space through adjustable floor diffusers.
- 4 The building will be heated by a perimeter trench heating system fed by a high efficiency condensing boiler.
- 5 The fresh air will be supplied into spaces through a pressurised floor void, known as a plenum which also provides the main distribution route for cabling.
- 6 Inside the offices, exposed concrete ceilings will play a role in regulating the temperature. Concrete provides thermal mass, which can absorb heat during the day and release heat during the cooler nights when the earth duct supply system will also operate to provide free cooling.
- 7 Ventilation is controlled automatically night and day to optimise the use of available night cooling without leaving the windows open.

Benefits of earth duct cooling

- Large energy savings over both natural ventilation and air conditioning.
- Allows ventilation and cooling at night so windows can be kept shut without stopping the free cooling process.
- Windows can be opened during the day, unlike with air conditioning systems.

Figure 2: Simulated Air Temperatures in Business Village

