
Gloucestershire Police go to Ground

On 9th June Brigadier Michael Browne, CBE and Chair of the Gloucestershire Police Authority officially opened the highly acclaimed Private Finance Initiative (PFI) Gloucestershire Police Headquarters in Cheltenham.

This £20m building that is both an HQ and a training centre, is the UK's largest ground-source heat-pump project to date, with the geothermal design providing 646kW of heating and 756kW of cooling for this flagship building, that will house up to 400 people.

The scheme's architect and engineers - McBains Cooper, were very aware that innovation would need to be top of the agenda in order to meet the scheme's demanding energy targets. It was therefore decided that a solution based on geothermal principals would be an excellent answer for this project, and they turned to Coventry based Geothermal International, ground source heating and cooling experts, for advice on the design and installation of the system.

MOTHER NATURE LENDS A HAND:

Geothermal literally means, "heat from the earth" and as such occurs naturally, however it is more readily accessible in some global locations than in others.

Lower temperature geothermal resources are found in many parts of the world, including the UK, and can provide useful energy for applications such as agriculture, industrial processes and, as in this instance, for heating and cooling buildings.

The principles of Geothermal heating (otherwise referred to as ground source heating) are based upon utilising the natural below ground constant temperatures. In winter drawing from the ground

TOPIC:
Ground-source heating

LOCATION:
Gloucestershire

COMPANY:
Gloucestershire Police HQ

to supplement the buildings' heat requirements whilst in summer discharging excess heat into the ground - in this instance via 180 boreholes, containing loops of pipework sunk deep into the ground.

2-WAY PUMP SOLUTION:

With an upper limit of 24 degrees C specified for the building, which could not be exceeded without heavy financial penalties being incurred by the contractor, lateral thinking was required, as this ruled out natural ventilation the obvious low-energy answer. The final solution specified in conjunction with Geothermal International, found the most effective way to resolve this, was by installing 9 x 90kW Water Furnace reversible heat pumps. Conversely in the winter the system will extract heat from the ground at around 10 degrees, the heat pump will then upgrade this and transfer it to the heating system.

The innovative solution needs pumps to move the heated/cooled liquid and this is where the TP range of Grundfos variable speed pumps come into the equation. This range of in-line, close-coupled circulators provide solutions up to 25 bar and are suitable in a wide range of heating, cooling and air-conditioning solutions, making them the perfect option in this scenario.

Available as a TPE, these variants are electronically speed-controlled pumps that are extremely energy efficient, as they match their performance to the system demand and therefore only work as hard as they need to - a profile that fits perfectly with the low energy demands of this project.

AN 'EXCELLENT' RESULT:

The new building set itself very high standards of being an environmentally friendly, low energy building. The finished product has actually achieved the highest and most coveted, BREEAM (Building Research Establishment Environmental Assessment Method) rating of Excellent. To add to the overall success of this project the project was also delivered on time and to budget.

To achieve such high standards means getting all the aspects right and this is why Grundfos, a pump supplier recognised as groundbreaking in their own right, were delighted to partner Geothermal International in providing the solution.

As a result of this success there are many more geothermal projects at varying stages of specification/development. This is a solution that really does provide a sustainable answer to delivering energy – through harnessing and augmenting the earth's natural resources.