The Cockcroft Building
7th & 8th Floors
The University of Brighton

Green Dot Awards 2014
Public

Fraser Brown Mackenna Architects

The Cockcroft Building 7th & 8th Floors

University of Brighton

Mixed use academic building

Built in 1962

Phased refurbishment

1,250 staff and students

Reduced energy demand

132 PV panels

Solar corridor

Improved thermal performance

Improved spatial quality

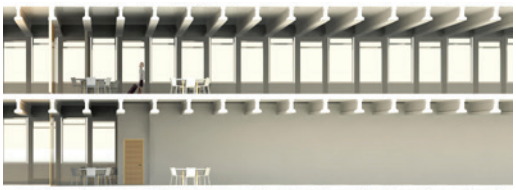
Rising ten storeys, the Cockcroft Building is the most prominent building on the University of Brighton's Moulescomb Campus, providing 15,000m2 of mixed-use academic space. Though structurally sound its complex infrastructure had reached the end of its design life with accessibility, building services and fire egress all requiring urgent improvement. The thermal performance of the envelope was very poor and the cellular division of internal spaces had not only led to a 'pepper potting' of similar activities across the building, but meant that some spaces were prone to overheating, particularly along the southern elevation.

FBM were appointed as architect and lead consultant and early considerations to demolish the building where soon dismissed in favour of a sustainable, retrofit and refurbishment approach - a reduction in CO2 emissions being a strategic driver for the project. The 7th and 8th floors (phase 1) of the building have just been completed providing lecture halls, teaching labs, meeting rooms and staff offices. The refurbishment addresses issues with usability, infrastructure and sustainability and provides state-of-the-art accommodation for the Faculty of Science and Engineering.

Improving Thermal Performance

Improving the thermal performance has been a priority, achieved by super-insulating the envelope with high-performance windows and fully lining the external envelope with insulated plasterboard. Internally, we celebrated the concrete frame by stripping back the existing finishes to leave the structural beams and slabs exposed – this provides exposed thermal mass to smooth out temperature swings and creates an industrial aesthetic to suit the engineering faculties within.

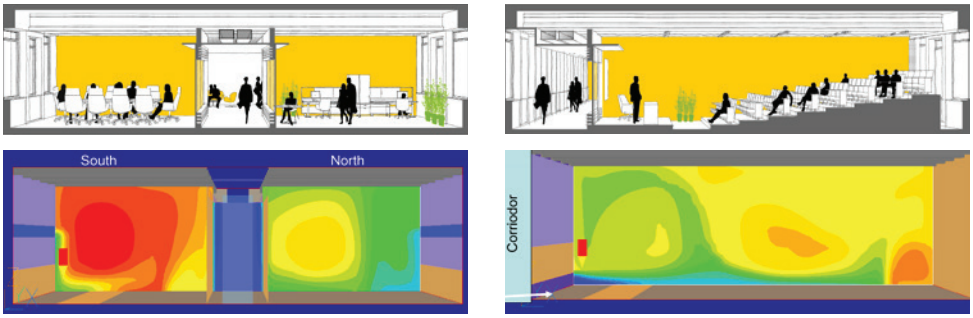
Aerial view of the building



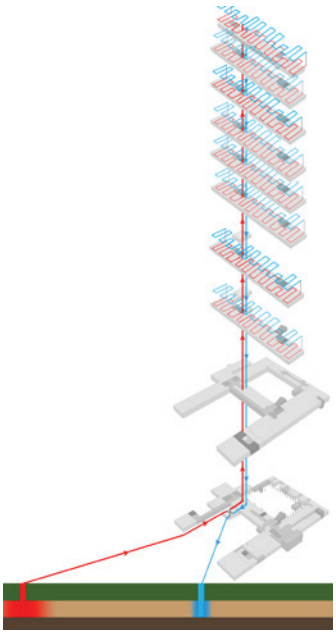
Section showing exposed structure

Short perspective section showing PVs at roof level

Photo of 7th floor solar corridor



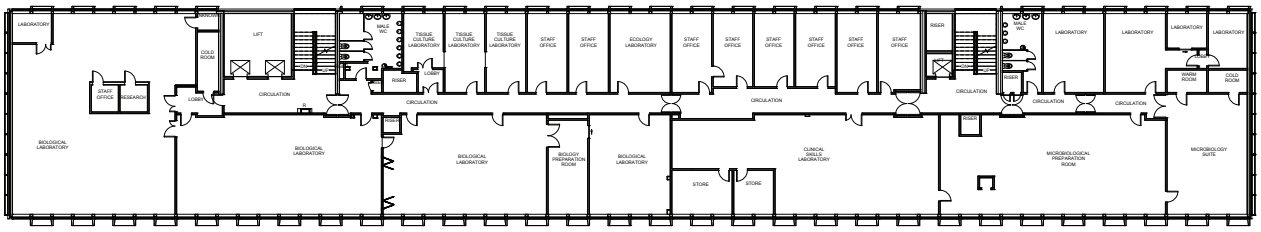
Thermal model comparing spine corridor with solar corridor along Southern facade



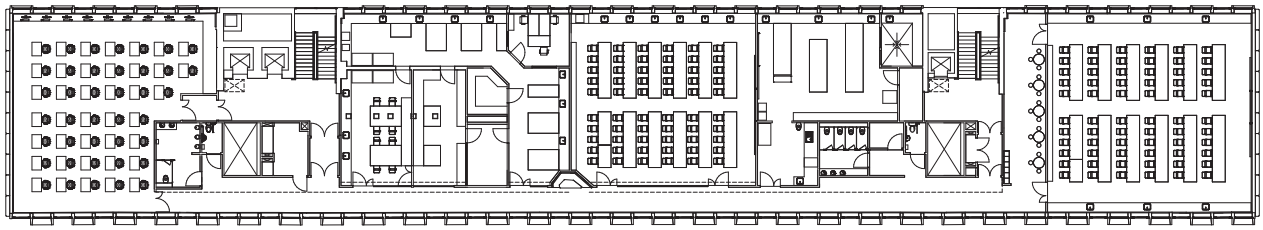
ATES system

Aquifier Thermal Energy Storage
An innovative heating and cooling solution is provided by an Aquifier Thermal Energy Storage (ATES) system – this works like a huge ground source heat pump, but with the additional benefit of storing surplus heat underground in the summer for use in the winter, and surplus coolth underground in the winter for use in the summer. This will reduce carbon dioxide emissions by 33 700 kgCO_2 per year.

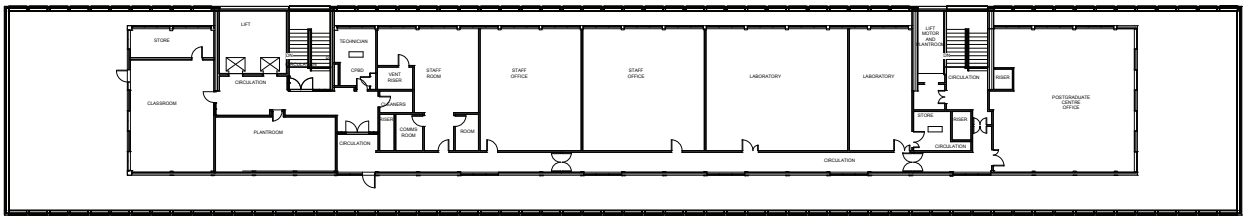
Solar Corridor
In providing new accommodation for teaching space, we have altered the pattern of circulation from a central corridor solution (which resulted in cellular spaces along the southern frontage, which were prone to overheating - as shown in our thermal model above) to a corridor running along the southern edge. This has not only exploited the unusually wide spans and column free space offered by the concrete structure but offers several other practical benefits. The corridor creates a 'buffer' space between the southern elevation and the workspace beyond, reducing overheating and equalising internal temperature differences (see model above). It also provides a flexible and future proof teaching space which moves away from traditional lecture theatre and seminar room designs, to reflect a less didactic and more collaborative approach to learning, with more breakout and informal learning spaces for group-working. Finally it has improved the quality of the environment by offering impressive views towards the coast.



Previous Seventh Floor Plan



New Seventh Floor Plan



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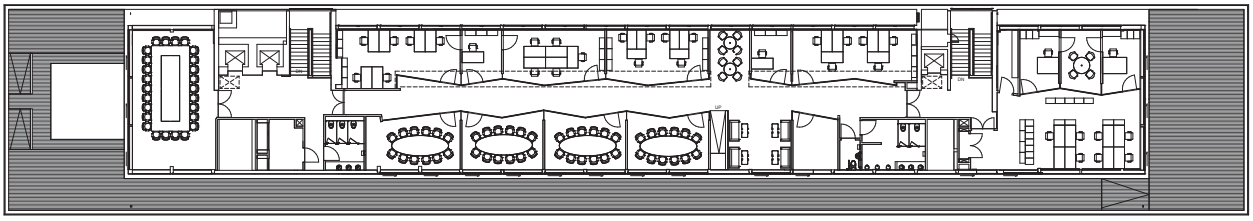

New Eighth Floor Plan

Re-use & Future proofing
In university buildings like Cockcroft – the interior finishes need to be robust, durable, adaptable and economic. The exposed galvanised steel raised-access floor system ticks all of these boxes whilst remaining in keeping with the industrial aesthetic. The flooring allows easy access to the services below, creating flexible spaces which can easily adapt to the building's changing educational demands. In keeping with our aim to sustainably extend the buildings life - second-hand floor tiles were specified, removing at a stroke the embodied energy involved in applying new tiles.

Rooftop Photovoltaics
132 photovoltaic panels have been introduced at roof level generating 44 521 kWh in their first year of operation.

Result
The refurbishment is already being regarded as a success on many levels: aesthetically as it celebrates the building's past through exposing its structure and industrial character; and functionally through providing highly flexible teaching spaces. Finally, applying our sustainable 'reuse, refurb, retrofit' strategy will result in a dramatic reduction in energy use (from 303,000 kWh to 166,000 kWh) and carbon dioxide emissions (from 49.0 Kg CO2/m2 down 45% to 27.2 kgCO2/m2) each year, giving the university a 66% reduction in energy costs. FBM are pleased to have contributed to the transformation of the Cockcroft Building, releasing its full potential and extending its life far into the future.

Project Details

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Fraser Brown MacKenna Architects is a design-led and customer focussed practice creating successful places to live work and learn. The practice was founded in 1991 and has developed a reputation for its ability to deliver successful results with limited resources through intelligent contemporary design, using new materials and ways of working.

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