Engineering Consultants

Physics Laboratories, Rooms B2 & B3, University of Exeter

Description

- SDS were appointed by the University of Exeter to produce a conceptual design to convert two existing rooms into a facility to accommodate the Exeter Time Resolved Magnetism (EXTREMAG) team
- We produced a full set of conceptual requirements, captured within both drawing and report formats, to communicate clearly the proposed mechanical and electrical requirements
- The initial concept layout was based on the client's outline ideas, which were communicated through a series of end-user workshops
- The overall project included phased, time critical work, enabling activities to vacate the rooms before the design and pre-construction duties could begin.

Benefits Delivered

- Report produced, detailing all systems and services, including how they connected or interfaced with the existing systems
- Clear conceptual drawings provided easy understanding of the extent of our mechanical and electrical proposals
- An early cost plan allowed the university to plan and consider any required value engineering to prevent the project from exceeding allocated budgets
- All major technical and financial project risks were recorded and monitored throughout the design allowing management of risks
- Preliminary builder's work information was provided to the building team for their early consideration
- Space planning around plant and equipment requiring future maintenance was our priority to ensure safe and easy access
- Building Regulation and industry standard documents were referenced to provide compliant proposals.

Phased works to remodel two existing physics laboratories, Rooms B2 and B3

Involvement

- Full visual surveys to understand the existing mechanical and electrical systems, and the space required for the proposed new services
- Access control and door entry system interlock with laser shields to provide safety measures against harmful lasers
- Specialist laboratory gas systems were included to the requirements of the end-users
- Careful design of ventilation systems to provide close temperature control and fresh air to the below ground rooms
- All other mechanical and electrical systems and provisions, to provide a fully fitted-out, functional and comfortable workspace.

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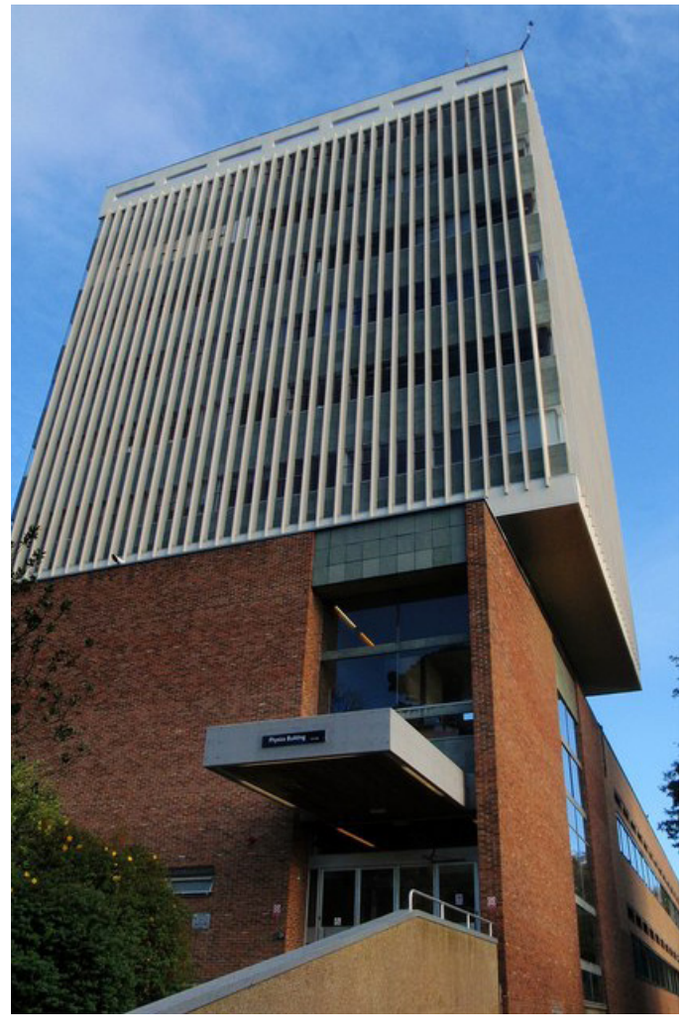
University of Exeter Physics Tower

Description

- The Physics Tower offers teaching and research space for the University of Exeter's physics faculty post-graduates and fellows
- The building is an existing eight-storey, in-situ concrete frame tower, constructed in the mid-1960s. It has external precast concrete mullions, acting as structural columns, supporting the edge beam and floor slabs
- The existing block has single-glazed sash windows with spandrel panels requiring replacement, as part of maintenance to structural concrete mullions
- The work provided an opportunity to reduce the ongoing maintenance and improve the thermal performance of the building's envelope, reduce infiltration and address summer over-heating problems.

Involvement

- We liaised closely with the architect to review façade proposals. Full thermal and energy analysis was undertaken for four options to assess the effect on internal conditions and energy use
- Working in conjunction with the team, we developed a replacement window system, incorporating automated opening windows and mixed-mode ventilation systems
- We undertook detailed visual inspection of the existing mechanical and electrical engineering services to establish the systems affected by each option
- Careful design of ventilation systems to enabled close temperature control and fresh air to the below ground rooms
- Identified space requirements for new mechanical plant items
- Provided full suite of mechanical and electrical documents for tender purposes and supported the professional design team.



Benefits Delivered

- Working closely the university, we identified an opportunity to connect the existing low temperature heating system to a local district heating system within an adjacent building
- Building analysis of façade addressed overheating risks and emissions level, including occupancy behaviour interviews. Four façade options were modelled, with different cladding and window alternatives to determine the most cost effective and technically viable solution
- We identified abnormal building heat loads and buildings areas where supplementary cooling was required to maintain reasonable comfort conditions
- Specified lower energy LED luminaire replacement with daylight controls to reduce latent lighting heat gains aiding thermal comfort within spaces
- We identified a requirement to establish occupancy behaviour to inform the overheating studies. We interviewed department heads to establish likely and peak times of occupancy to inform the modelling process
- In reviewing the brief, and subsequent surveys, we established that several items of key equipment, with significant heat gains, were not scheduled
- Collaborative engagement with integrated design team to overcome difficulties associated with space and access for new building engineering services systems
- CO_2 emissions and energy consumption of the existing building have been assessed against the refurbishment proposals. CO_2 emissions were reduced by 26% saving 29.6 tonnes per annum and provided energy savings of 31%.

Replacement windows and ventilation in this teaching and research building at the University of Exeter to the value of £2m. Carbon emission reductions of 29.6 tonnes CO_2 per annum and energy savings of 31%