Case Study

University of NSW Science & Engineering Building (SEB)

Project
UNSW - Science & Engineering Building (SEB)

Client
UNSW - University of NSW

Location
Sydney, NSW

Market
Education

Project Type
Mechanical Services Design & Construct

The new Science and Engineering Building at the University of New South Wales has reinforced A.G. Coombs' capability to design, construct and deliver complex mechanical services systems that serve a multiplicity of research environments.

The latest addition to UNSW's Physical Sciences precinct at its Kensington campus in Sydney, the new Science and Engineering Building (SEB) features world-class research facilities designed to foster learning and research breakthroughs as well as provide contemporary spaces for students and staff.

The ten-storey building – designed by Grimshaw architects and constructed by main contractor Multiplex – is a companion building to the adjacent Hilmer Building, with the two sharing similar internal layouts, as well as a physical connection and a number of services.

It features seven levels of modular laboratory spaces arranged at the core of the building. These labs are surrounded by light-filled offices, lecture theatres and classrooms to the perimeter.

Ground and basement levels are dedicated to teaching and study facilities, the Mark Wainwright Analytical Centre (MWAC) and UNSW's Creative Practical Lab that features the state-of-the-art Io Myers Studio and Studio One performance theatres.

Following a two year period of design development led by engineering firm Arup, A.G. Coombs was engaged by Multiplex as the project's mechanical services specialist contractor under a Design and Construct contract.

Taking Arup's preliminary design, A.G. Coombs relied on its engineering, building information modelling (BIM), prefabrication and commissioning capabilities to deliver a range of complex mechanical services to support the multiplicity of spaces and functions within the building.

The modular laboratory arrangement and corresponding mechanical services layout was improved through A.G. Coombs' design that saw the laboratory exhaust system removed from the services-heavy corridor space and instead run through the laboratories alongside the supply duct.

This had the effect of decongesting the corridor and allowing for an easier installation of all services, while minimising penetrations through the smoke-proof walls dividing the laboratories and corridors. Additionally, A.G. Coombs proposed the adoption of a manifolded fume cupboard exhaust system that required a risk assessment to be completed prior to reaching agreement with UNSW stakeholders.

It was shown that through the use of a manifolded strobic exhaust fan system, a static pressure could be maintained in the duct thereby enabling a single large fan system with N+1 redundancy to serve large numbers of fume cupboards without the need for the same number of exhaust fans. This solution offered considerable energy efficiency benefits. Where the use of some chemicals made a manifolded system non-permissible, dedicated fume cupboard exhaust fans with onboard scrubbers were used and a constant volume achieved via a bypass sash.

A number of other efficiency improvements were made in the final mechanical services design.

The equipment cooling water (ECW) system, used to support laboratory equipment, was redesigned to a gravity return system while the deletion of acoustic louvres at the cooling tower compound was achieved through the adoption of low noise cooling towers featuring water silencers. Plantroom layouts were also reconfigured to improve installation and maintenance accessibility.

Corridor modules, services risers and laboratory supply air branches were all constructed off-site using prefabrication techniques, as were the pump skids and large chilled water and condenser water pipe modules that serve the building's central energy plant.

The use of prefabrication aided in the quality of construction, reduced site activity and associated safety risks and accelerated the mechanical services installation significantly.

A.G. Coombs also led the coordination of services and building information modelling (BIM) – the latter critical in the delivery of the project on time and on budget given the compressed construction programme and complexity of services.

Practical completion of the main works was reached in February 2019. The completion of the basement performance theatres and fitout of Level 5 and 6 laboratories followed in mid-2019.

> "A.G. Coombs is recognised for its technical capability, quality and experience in prefabrication and this is evident throughout the mechanical services systems that serve the variety of uses across this building.
>
> Glenn Geary - Mechanical Engineer Building Services / HVAC

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