

Concurrent Session I
Wednesday 14 September 2016
10:15am – 11:05am



Session 4
**Case Study: Western Sydney University, New Science Centre,
Parramatta Campus**
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Shane Wood is dwp|suters' National Education Leader, he works across all studios, advising on education masterplanning, facility design and procurement. He leads a national architectural team of education experts in university, TAFE and school projects. As a senior architect, Shane is an active advocate for innovation and research in education. His portfolio includes many examples of adaptive reuse of education buildings as well as sustainability initiatives focusing on the physical, financial and social environments.

Anthony Matthews is a national Director of Umow Lai and the NSW State Manager. He leads a group of innovative Building Services engineers, who challenge the status quo in all elements of the design process. Anthony is a multi-discipline engineer, with a passion for innovation and practical sustainable design. Anthony has gained experience working throughout Australia on a variety of projects in the Education, Commercial and Health sectors.

A new \$25M Science building for Western Sydney University on Parramatta South Campus replaces the outdated facilities on the Parramatta North Campus. The new science centre delivers a state-of-the-art contemporary fit-for-purpose facility allowing for teaching and research in the physical, chemical, and biological sciences. An advanced simulation laboratory allows students to engage in high-level simulation and other blended learning opportunities. The centrally located science research facility provides greater opportunity and engagement with industry partners across a wider geographic area.

The new facility accommodates teaching and research science facilities as well as Social Science and Psychology. The design focuses on presenting the building as a gateway to the central heart of the campus and sympathetically nestling a large three storey building amongst the heritage significant Vernon Lawn precinct buildings with a layered planning solution that maximises utilisation, integration and collaboration. A flexible informal learning precinct carried through the building bridges transparent Laboratory spaces with academic and research offices to encourage greater opportunity for integration and collaboration. The rear facade of the laboratory facilities provides a dedicated vertical and horizontal services reticulation zone with gantry access screened by semi-transparent panels.

With a limit on site electrical capacity, and an initial briefed target of 5 Star Green Star, Umow Lai, the building services engineers, set out to design an extremely low energy laboratory facility. With planned upgrades to the Parramatta Campus central thermal plant system highlighted to the team at an early stage, a 6 star outcome seemed increasingly achievable. A commitment and clear understanding to a rigorous process to achieve 6 stars was required by all parties involved at the outset of the project and was crucial to the project success.

Core to the achievement of any high Green Star rating is the ability to optimise energy efficiency for all services systems. In this vein, the New Science Building systems include a 100kW PV Array, gas

boosted solar hot water and LED lighting throughout. An innovative HVAC system utilises activated building mass (Concrete Core Tempering) to efficiently deliver cooling and heating to spaces independent of airflow – particularly effective in laboratories containing fume cupboards which necessarily move high quantities of air. High efficiency dehumidification Air Handling Units were used to ventilate the building with 100% fresh air to ensure the highest possible indoor air quality for the building.

A feature of the Active Mass based HVAC system is the requirement for exposed concrete soffits to allow for the radiation of cooling/heating from above. While this was embraced and exploited for aesthetic appeal, it introduced significant coordination challenges for the entire design team as all structural elements were exposed, and no ceiling voids were available to conceal the myriad of services required to complete the building.

Through utilisation of detailed 3D computer modelling (BIM) the whole design team collaborated to deliver a highly coordinated building solution that maximised the positive appeal of a high spec exposed concrete finish while fully servicing the building via a combination of exposed, cast-in and cleverly reticulated services elements. The presence of an external services gantry, introduced at the concept stage, also assisted by allowing all major air handling plant as well as fume cupboard exhaust flues and the majority of lab gas and hydraulics reticulation to be located external to the building envelope.

With a change to the planned Central Thermal Plant upgrades and the requirement for significant cost savings to be realised in order to meet the project budget, the entire design team had to face the significant challenge of meeting original targets from a different base line. This required close collaboration between the Architects, Structural and Services Engineers, University and the appointed Managing Contractor and sub-contractors to closely scrutinise the proposed cost savings measures for their impact on building performance.

Site constraints such as a high pressure Caltex fuel pipeline imposed strict building and excavation restrictions challenging design and construction approaches. The adjacent rail line involved innovative solutions to deal with sensitive laboratory equipment subject to electromagnetic interference and vibration. The heritage and archaeological significance of the campus and precinct of buildings required a lengthy process of design reviews, archaeological testing and approvals with local authorities.

By forming a close working relationship between all parties, the design team were able to successfully integrate seemingly contradictory goals into a final solution that has successfully met all the requirements while resulting in an exciting educational facility for staff and students alike. Success of the final outcome is testament to a true collaborative and integrated process.