

INNOVATION AND TRANSFORMATION IN ADAPTIVE RE-USE OF UNIVERSITY FACILITIES

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INTRODUCTION

This paper will explore the dilemma facing many universities as they look to optimise the value of ageing building assets - replace or re-life?

In keeping with the theme of the 2012 conference: 'The Right Blend: Innovation and Transformation', this paper will investigate 'The Right Facilities' and present case studies where the decision to retain and re-life obsolete building stock has been highly successful.

As the dynamic needs and expectations of tertiary institutions rapidly evolve and interdisciplinary interaction and collaboration builds, campuses need to provide more flexible, multi-functional and connected learning spaces for increasingly diverse cultures and communities.

The learning experience has been changing rapidly with the contemporary tertiary environment enabling learning opportunities which suit modern lifestyles. The integration of information and communication technologies permits 24/7 access to collaborative teaching and learning.

In step with these changes, the physical design of university facilities has evolved to reflect the growing demand for more open, flexible and adaptable spaces.

Most established universities find themselves with building stock that does not readily support this evolution in teaching, learning and research. In many cases, these buildings have heritage significance with major constraints on options for their future use.

Some of the challenges inherent in the re-living of these facilities are:

- Building Code of Australia and Disability Discrimination Act compliance
- achieving functional outcomes within the constraints of heritage environments
- integration of building services upgrades into the existing building fabric
- providing open and flexible spaces within existing structural constraints
- improving sustainability, e.g. reduction in energy consumption, improving air quality, increasing natural lighting without solar gain.

The challenges can generally be overcome - often with spectacular results. A number of case studies will be presented to demonstrate successful responses to demanding physical and cultural environments. The case studies will include:

H BLOCK QUT GARDENS POINT CAMPUS

H Block was constructed as part of the initial development of Brisbane Central Technical College which opened in 1915 and is a State listed heritage place. It has also been listed on the Brisbane City Council Heritage Register. It originally housed Civil and Mechanical Engineering. The rear wing of the building with its Boiler Room and Engine and Material Testing laboratories was treated differently from other buildings on the campus. Large arched window openings reflected the voluminous testing laboratories, and a brick flue was constructed near the boiler room. The boiler room was demolished in 1971 to make room for a new block to the south west.

The University needed to provide accommodation for higher degree research students from the faculties of Built Environment and Engineering, and Science and Technology. The neglected H Block was considered appropriate as the proposed fit out was generally in open plan format and not highly serviced. Only a small quantity of office space was proposed. The main change to the existing space within the workshop was the introduction of a mezzanine floor. The new mezzanine is accessed by two new stairs and provides access to the offices above the existing toilets.

The objective was to provide flexible, comfortable and creative studio spaces to encourage higher degree research students to engage, collaborate, write and present their theses. A place to inspire creativity and new ideas.

As a first step, we engaged heritage consultant Ruth Woods to prepare a Statement of Impact based on the existing building fabric and significance and the proposed use. The spaces proposed to be adaptively re-used for this project had not been actively used for many years and were full of outdated equipment, redundant services and miscellaneous storage. As a result of the lack of use, the spaces had not been well maintained. Two gantries with block and tackle still remained as did concrete plinths and platforms used for materials testing prior to these procedures being relocated elsewhere on the campus. Materials testing is now undertaken off site or through computer simulation.

History had also overtaken H Block despite its strategic location within the core of the campus. More recent buildings and high level pedestrian walkways around it had resulted in it being a forgotten treasure. As a result our contextual framework for the design was based on the idea of 'The Secret Garden', bringing life, colour and activity to the interior of the building. This raises a common theme in these case studies – the lack of connectivity and accessibility resulting from the diminished relevance of many older and neglected buildings in campus planning.

Other than improving connectivity and accessibility we faced some other significant challenges to achieve the planning objectives.

The major challenge was a structural one – we were unsure what conditions we would encounter under the various service voids and workshop trenches to support the new mezzanine. It was decided that a provisional sum would be allowed to deal with this during construction if conditions differed from what we reasonably anticipated.

Another challenge was the building services – not the services required for our project which were relatively modest, but we had to deal with campus trunk services – in particular fire services and chilled water – that ran through the building and needed to be designed around.

Thankfully accessibility and DDA issues were straightforward – no lift was required due to the size of the mezzanine and the two new stairs provided good accessibility and egress.

The new use has conserved many of the significant elements such as the exposed floors to the underside of Level 2, the removal of unsightly infills to the arched openings, and the retention of the lifting gantries with the existing sets of block and tackle.

The design needed to impose minimal impact on the fabric of the building, and also enhance the existing features. The result is a contemporary, dynamic and flexible layout that elevates the heritage significance of the building and precinct. It has been said that the most sustainable building is a building you do not have to build, and in that context the ‘new’ H Block is a great success. It was also recognised in this years AIA regional awards program with a commendation in the Interiors category.

BOILERHOUSE COMMUNITY ENGAGEMENT CENTRE, UNIVERSITY OF QLD IPSWICH CAMPUS

A project that has similar attributes and challenges to H Block is the adaptive re-use of the former boilerhouse at the Ipswich campus of the University of Queensland. The Ipswich campus which opened in February 1999 was established in the former Challinor Centre, a state-run institution that had a long history in Ipswich dating back to the 1870s, looking after a range of different people with mental illness and intellectual disabilities. The site is permanently entered in the *Queensland Heritage Register*.

The boilerhouse was built in 1913, and housed an engine that provided power, and boilers that provided steam for the laundry. The project brief was to create a community engagement centre that would facilitate a range of community services as well as training and research facilities. It was of critical importance to the client and the project team that the adaptive re-use of the former boilerhouse followed conservation best practice methodology and techniques.

As part of the interpretation and planning for the new uses, one of the two original boilers was removed and relocated to the Ipswich Railways Museum for restoration and display. The remaining boiler was refurbished on site and enclosed by glass as a permanent reminder of the history of the building and precinct.

As done in H Block, a mezzanine structure was inserted into the existing space. The materials palette was largely steel and glass designed to be lightweight, transparent and lightly touch the existing building fabric. In this instance a new passenger lift was required, driven by the intended use of the building by the public as well as university occupants. The size of the mezzanine floor also played a part in the decision.

As experienced in H Block the new mezzanine provided a structural challenge, complicated by the need for a passenger lift. The new structure was designed to ‘float’ independently of the existing fabric as much as possible and the additional load was supported by new footings

built under the existing slab floor.

Thankfully the building was structurally sound and provided a solid and cost effective base for the adaptive re-use works. The external form, including the dominant landmark chimney stack was relatively intact, but new entrances, windows and roofing needed to be installed. The internal steel trusses were left exposed and the general sense of industrial aesthetic and patination was retained.

The services intrusion and upgrade was minor overall with upgraded electrical capacity and exposed air-conditioning ducts installed.

The issue of connectivity and accessibility was important for this project, given the broad range of on-campus and off-campus users. The boilerhouse is located on the edge of the main core of academic buildings on the sprawling campus and is easily accessed within the campus on foot, or by car for the community users of the facility.

The end result of the project is a functional and cost effective accommodation solution for the various building users within a restored heritage building which respects and celebrates its former use while making a relevant and important contribution to the future of the campus. Having a shared vision between the client and the project team, and engaging a proactive and experienced building contractor were key success factors.

BLAIR PAVILION AND CHARLES HOUSE, UNIVERSITY OF QLD IPSWICH CAMPUS

Also on the Ipswich campus of the University of Qld, we have recently completed design studies for the adaptive re-use of Blair Pavilion and Charles House. As I mentioned earlier this campus contains a wonderful assortment of significant buildings spread across its generous and spacious state heritage listed site. Situated in the south-western corner of the site, Blair Pavilion and Charles House have been vacant for many years.

Blair Pavilion was built in 1908, designed as patient wards by the State Works Department. It is a fine example of the Arts and Crafts style. It is considered a highly significant building on the campus and has many typical features of the style, including the skillful incorporation of the ventilation system into the roof design. It remains as vacated by Family Services Dept and is generally intact in planning and fabric. As you would expect parts of the building have decayed despite some maintenance, but its two level structures remains a powerful form within the campus.

Charles House was built in 1917 as a male admission ward. It was extensively modified and extended in 1961 and is currently used for storage pending re-use. It is a single level building and its condition is not as good as Blair Pavilion. It is considered in the Conservation Management Plan to have some significance.

As two of the last buildings on the Ipswich campus to be restored and re-lifted, the University is keen to explore potential uses and users to enable works to commence. The separation of these buildings from the main campus core, and the construction of a new high school on land behind the buildings, has raised concerns about security and vandalism, some of which has already occurred. Some of the more creative school students have made the buildings

appealing for late night exploration through stories of ghosts!

The University engaged Suters to explore refurbishment options for these structures, both of which are structurally sound and visually prominent. It was an interesting and challenging design exercise – no specific brief, no specific end user, just a concept to enliven the buildings with a focus on university uses or commercial tenants.

Early tasks undertaken included a meeting on site with the State Department of Environment and a heritage consultant to identify opportunities and constraints. A detailed review of the condition and asbestos reports also informed our approach to the planning options.

Services audits were also undertaken and confirmed initial fears that a large component of future upgrade works and costs would be the extension of services infrastructure, including power and chilled water. There was no nearby provision of these services and no way to avoid these costs should refurbishment and re-living works proceed.

Each of the buildings provided different opportunities. Blair Pavilion, with its cellular wing layouts, was suited to individual offices and small meeting spaces with the removal of part of the dividing walls. The cellular planning certainly provided a serious impediment to contemporary open office planning. It was also proposed that a section of the large central area on the upper floor be removed to create a two level entry space and introduce a steel and glass passenger lift and open stair, both required to meet BCA and DDA compliance. The introduction of air-conditioning and other services upgrades and modifications was also proposed. A generic planning arrangement was produced which included a mix of offices, meeting spaces, larger function or meeting rooms, and training facilities. These would work equally well for either University functions – faculty and administration, or external commercial tenants. The design proposals aim to integrate and highlight the use, form and history of the structures within a modern and dynamic workspace.

Charles House presented the opportunity to explore a range of options, including:

- child care centre
- conference and business centre
- faculty uses
- generic offices

A more specific potential occupant was then introduced into the planning mix. The Faculty of Health Sciences identified a need for a Plastination Laboratory on the campus and plans were prepared to a user brief demonstrating how this could be achieved successfully within the existing building envelope of Charles House.

It is hoped that suitable tenants are identified in the near future to see the vision for these important buildings to be realised.

The key challenge in this exercise is providing connectivity between these buildings and the campus heart – they are remote in a physical and infrastructure sense.

FISHER LIBRARY, UNIVERSITY OF SYDNEY

In contrast to the previous examples of introducing new functions within a heritage

environment, is our current work on the Learning Network Precinct for the University of Sydney.

The most significant aspect of the project has been the refurbishment of the Fisher Library. Opened in 1963 when the University had 14,000 students, today the Fisher Library serves around 50,000 students and receives more than 1.3 million visits every year. The later addition of the nine level Bookstack wing in 1971 confirmed its significance and importance within the campus. The Fisher Library has been classified as significant building on the NSW Heritage Register. Given this prominence, the brief was to enhance the student and researcher learning experience while also retaining the library's original character and use of materials.

A key driver for the redevelopment project was that the Fisher Library did not comply with the current Building Code of Australia (BCA) or applicable occupational health and safety and disability requirements – all legislative requirements of the University.

To address these issues, Sutera, in partnership with Geyer and Rubida Research, was engaged by the University to undertake the Teaching and Learning Capital Fund (TLC) and the Building Better Universities Renewal Fund (BURF) Project that also included the University's nearby Carlaw Building, Wallace Theatre and the Peter Nicol Russell Building. Works to these three 1970's buildings consisted of transforming former lecture theatres and teaching spaces into informal student commons, group learning spaces and IT zones. Also outdoor 'found' space has been transformed into an outdoor street to improve circulation in and around the buildings.

The Conservation Management Plan prepared for the Fisher Library served as a compass and reference point for the upgrade project. As a purpose built library asset, the nine level Bookstack presented a number of challenges as an adaptive re-use exercise. Location of narrow windows to suit stack aisles, constrained entry access through the Link Building, non compliant fire services and egress, and insufficient toilet facilities to cater for the enlarged student population – these were some of the challenges encountered and overcome. In addition, with the library to remain operational throughout the redevelopment, the need to consider how the works were to be carried out and the requirement for minimal noise and dust disruptions was a critical part of the design process.

The University's need to redevelop the library presented the opportunity to optimise the utilisation of space for staff and other resources as well as create a better student and research experience through activating a 'Learning Network' or series of linked learning hubs. Where previously there were no collaborative learning zones within the library, through a reconfiguration of the existing space and the reprioritisation of traditional stack storage, students and researchers will also be encouraged to move between adjoining learning precincts extending south to the Peter Nicol Russell Building.

Although originally designed as a library when its primary resource was books, the new brief required the culling of one million books, catering for an enlarged student population, modern technologies and flexible learning spaces. With a focus on space and seating capacity, the new design opens new learning and collaborative zones in the library and associated buildings, providing maximum configurational flexibility and technology accessibility, all interconnected to the library resources.

The new Fisher Library design reflects international education trends in providing more

corporate style learning environments for students. Offering a dynamic look and feel, the new learning hubs reflect an ambience which is vibrant and attractive, and -most importantly- engages the student.

The need to consider the design in line with the University's budget was critical as was the requirement to develop an overall redevelopment plan which progressively considered future funding as it becomes available to the University and as priorities evolve. This included the consideration of future ground level retail opportunities.

With legislative requirements to significantly widen and also lower the library shelving and the University's commitment to release areas of this space back to student learning hubs, around half the library's shelving capacity, an equivalent of 26 kilometers was removed. The Bookstack now comprises just over five levels of book storage compared to the original nine levels. The free space generated by this rationalisation has been largely given back to student centered activities such as internet based study areas, reading lounge spaces, and flexible training rooms.

Sustainable attributes of the project include selection of materials with high recyclable content and with less noxious gas emissions, and energy saving measures such as lighting sensors.

CLIMATE CHANGE FACILITY, UNIVERSITY OF WESTERN SYDNEY HAWKESBURY CAMPUS

The Fisher Library responded to changes in technology and pedagogy, and addressed issues of code non-compliance in a building of architectural and cultural significance. In contrast, the new Climate Change Facility at the Hawkesbury Campus of the University of Western Sydney presented an exciting opportunity to reflect the aspirations of a climate change and energy research facility through innovative sustainable initiatives.

The existing building, dating from the 1930's, featured double brick walls and trussed dutch gable roofs, and provided a unique set of challenges to adaptively re-use the building and integrate the requirements of the project brief. A new double storey glass facade was introduced, enclosing an 'environmental atrium' incorporating plants, pedestrian activity and multi -purpose zones to activate the building.

The client brief required a conversion of the existing building into a facility that would support and showcase leading research into the effects of climate change on plants.

To reflect the sustainable research done in the facility, the design incorporated a number of sustainable attributes into the built form. As the main building facade faced west, the new atrium was double glazed to reduce heat load, assisted by the inclusion of a metal louvre screen for the length and height of the facade.

Thermal chimneys are a strong visual element within the atrium. Air is drawn in at the rear of the building and taken through a sub-floor labyrinth and discharged as passive, ambient air within the atrium. The chimneys draw air from the atrium ensuring constant air flow and comfortable conditions. The success of the passive airflow throughout the atrium and the building generally can be measured by the fact that only the laboratory areas of the building

are air-conditioned. The atrium also assisted in a dramatic improvement in the levels of natural light throughout the building.

Building code and accessibility requirements resulted in a new stair and passenger lift being designed within the atrium. The refurbishment also resolved a number of program challenges including a major services upgrade and integration, and the incorporation of numerous PC2 laboratories. Plant propagation cells – essentially cold rooms – had to be built within the existing building structure.

This was another interesting project demonstrating how obsolete university facilities can be adapted and re-used through strategically exploring opportunities within the project brief and the building fabric to create a vibrant and relevant outcome.

CONCLUSION

All of these project outcomes demonstrate that existing buildings – whether protected by heritage significance or not – should be carefully investigated for their potential adaptive re-use and re-living.

This paper has identified the key challenges in adaptively re-using existing university building stock as:

- Building Code of Australia and Disability Discrimination Act compliance
- achieving functional outcomes within the constraints of heritage environments
- integration of building services upgrades into the existing building fabric
- providing open and flexible spaces within existing structural constraints
- improving sustainability, e.g. reduction in energy consumption, improving air quality, increasing natural lighting without solar gain.

Whilst these challenges may deter some, the above examples illustrate that properly planned and executed, older buildings can make a valuable new contribution to the campuses of tomorrow.

BIOGRAPHICAL NOTE

Geoff Street is a registered architect with over 30 years experience leading numerous significant architectural projects, especially in Queensland, New South Wales and New Zealand. Geoff has a keen focus on education projects, especially the design and planning of facilities for the tertiary sector. He is the Managing Principal of Suters' Queensland and a member of Suters' Board and National Executive. He is also President of the Association of Consulting Architects Queensland and active in the Australian Institute of Architects.

KEYWORDS

Adaptive Reuse, Re-Living, Heritage, Sustainability, Flexible and Adaptable Learning Spaces.