

Heritage & Sustainability 101

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Heritage has yet to make substantial in-roads into discussions of the long-term sustainability of the built environment. Much of the work in the field of sustainability undertaken to date relates to new builds, so called 'Green Buildings'. Far less has been written in relation to the benefits of conserving or responsibly retrofitting existing buildings, either for the purpose for which they were designed or to accommodate new uses. In the field of heritage we are constantly concerned with the significance of the fabric and rarely consider the resources already invested in erecting and using a building. Heritage conservation is inherently sustainable, but are we communicating this message? The heritage profession currently argues against demolition on significance grounds however we should also be playing the sustainability card.

Three planets

In his review of *Designer Suburbs* the Sydney architect Keith Cottier made a plea for the retention of well-designed suburban project houses of the 1960s, noting that Australians are rapidly using up resources in building anew, as if there were three planets to exploit (Cottier 2013). An integral part of the concept of sustainability is learning to live by carefully and sustainably utilising the resources of the only planet we have. Australian cities have not been destroyed by war, hurricanes or tsunamis as many cities have. The destruction of the historic built environment in Australian cities and country towns has been undertaken in the name of progress. We simply cannot afford to continue to waste the resource that is the existing built environment by rebuilding cities and suburbs at the rate that the pro-development lobby in Australia is currently advocating.

In suggesting strategies for improving the implementation of adaptive re-use strategies for historic buildings Sheila Conejos, Craig Langston and Jim Smith of Bond University's Mirvac School of Sustainable Development and Architecture note that:

Premature destruction of built assets for economic (often profit-seeking) motives with minimal regard for social and environmental outcomes is a contemporary characteristic of the developed world. (Conejos et al 2011:8)

But is it? European cities have long taken a more sustainable view regarding their building stock, frequently adapting substantial urban buildings for new uses time and time again. The Louvre in Paris, which started life as a palace, has since housed government departments and galleries. There are countless examples in Italy where redundant buildings have been imaginatively adapted for new uses. One of the most well known examples amongst architects is the Castelvecchio in Verona. In his interventions, Carlo Scarpa chose to strip out later modifications leaving the scars of previous uses. The building has served as a fortress, barracks and more recently a gallery.

The Consequences of Today

In 1971 the Royal Australian Institute of Architect's (RAIA) held a Centenary Conference on the theme of *The Consequences of Today*, Dr Stephen Boyden presented what he termed the 'Growth Gospel'. By 1980 the RAIA had adopted its Environmental Manifesto based on the ideas Boyden had presented.

The present era is characterised by two apparently irreconcilable schools of thought and the great conflict between them is of the greatest possible significance for mankind. On the one hand, we have the dominant doctrine of the modern western society that



Modern insertions by the architect Carlo Scarpa that serve to also reveal historic phases of use, Castelvecchio, Verona. Photo by the author

continuing economic growth is based on industrial expansion and the spread of technology...is not only inevitable...but is highly desirable. This view can be referred to as the western idea of progress or simply the Growth Gospel. On the other hand we have the ecological viewpoint which states that, because the resources of the earth are finite, and there are limits to the tolerance of the biosphere to chemical and other forms of damage, unhindered and unceasing growth of industry (and/or population) is not compatible with the long term survival of civilisation. Our society has every reason to take this controversy very seriously, as there is no escape from the logic of the ecological view (RAIA 1980:82).

Architects, the manifesto noted, had a special responsibility towards the environment due to their skills. Nearly 45 years later the Growth Gospel dominates and the manifesto seems largely forgotten. All too frequently buildings capable of being altered are demolished, and yet the building and its component materials are not substandard and have not reached the end of their useful life. Demolition is argued for as the building is viewed as being old fashioned, out dated or simply ugly, a view constantly promoted in Sydney by the development lobby.

Heritage listing results in a more sustainable solution being adopted, requiring the retention of significant elements of a building. Listed items however are only a very small percentage of the surviving building stock. A much larger percentage of building stock is capable of being retained and adapted, particularly within Conservation Areas. Buildings not yet identified as heritage items are particularly at risk and owners go to great lengths to obtain advice to ensure that their building does not become a listed item. Listing buildings as heritage items can ensure their retention when there is government will, but not when the state government overrides heritage legislation.

The 3L's

In the early 1970s the then president of RIBA (the British Institute of Architects) the Welsh architect Alex Gordon promoted the catch phrase 'long life, loose fit, low energy'. Gordon was advocating that new architecture adopt these 3L's but they equally well apply to the existing built environment. In his obituary of Gordon, Maxwell Hutchinson translated the phrase into what he termed today's language: Sustainability, Flexibility and Energy Efficiency (Hutchinson 2009).

The Sydney-based architect Tone Wheeler continues to promote 'long life, loose fit, low energy' solutions, believing that for 'true sustainability, buildings need to have endlessly adaptable futures' (Dolan 2010). Wheeler believes that building envelopes should be capable

of lasting, but component parts such as kitchens and bathrooms can be periodically replaced. This is an approach that can be readily applied to historic building stock such as nineteenth century villas, terraces and cottages where the building envelope has lasted. The conservation planning process guides the adaptive re-use of buildings, aiming to ensure that higher levels of change occur in areas of lesser significance and in areas where change has already occurred.

Recent case studies by Bond University's School of Sustainable Development and Architecture (Conejos et al 2012: 38) consider the success of 12 architectural award winning Australian adaptive reuse projects ranging from a residential conversion of a warehouse in Newtown, Sydney to the Broken Hill Regional Art Gallery and the adaptive re-use of a former hospital complex, Prince Henry (Coast) Hospital (Sydney). Some of their examples are projects that the heritage profession is very familiar with, but we view the outcome in terms of retention of fabric and streetscape, not for the contribution towards carbon neutrality. These Adaptive Reuse case studies acknowledge a number of the buildings are heritage items, but make no mention of the conservation planning process.



Disused ward blocks at Prince Henry Hospital prior to conversion into apartments. Photo by the author

Decisions taken during the master planning process for the Prince Henry (Coast) Hospital site, which provided for the retention of individual hospital buildings, were based on the relative levels of significance of the surviving buildings. The decision to allow the replacement of the sanitary towers to the rear of the 1930s Heffron and Delaney Wards was likewise based on an analysis of significant fabric. It was the older buildings planned according to Nightingale's hospital design principles that proved more adaptable. The wide balconies, high ceilings, attention paid to daylighting and ventilation make this building type well suited to conversion, particularly for residential use.



The Mint, one of the two surviving pavilions of the former Rum Hospital in Sydney, the construction of which commenced in 1810. Photo by the author

Wriggle Room

A more recent article in the RIBA journal seeks to apply Gordon's 3L's, noting that the initial uses of a building should only 'fix its outer parameters, allowing wriggle room for new uses to inhabit the shell' (Lifschutz 2014). This is not a new concept when it comes to colonial

buildings. The fledgling colony of NSW could not afford to waste substantial existing buildings; they adapted the building erected to manage the penal colony when forming their new government in the 1850s. One pavilion of the Colonial Hospital (the Rum Hospital) became Parliament House and the other the Mint. Both of these buildings survive today, the NSW Parliament still utilises the northern pavilion. The former Mint is part of the Sydney Living Museums complex. Likewise the National Trust centre is a former military hospital erected in 1818, converted into a school in the mid nineteenth century and then into a gallery and Trust headquarters. These buildings were all of the same standard type, an interchangeable 'healthy' barrack or hospital block of a type developed by the Royal Engineers in the West Indies. This was a building type that had evolved as a response to climate and health concerns, concerns that are just as valid today.

Educational institutions and hospitals today demand purpose built facilities, with little or no wriggle room, building in rapid obsolescence. Was it really necessary to demolish large numbers of larger scale modern hospital buildings and nurses' homes?

The substantial Queen Mary Nurses Home at Royal Prince Alfred Hospital has recently been converted into student housing. The University of Sydney purchased the surplus Nurses home from the adjacent teaching hospital. Whilst not listed as a heritage item, a conservation planning process was undertaken during this project. In part of the complex evidence of the original configuration was retained whilst other sections of what had been quite austere nurses accommodation has been modernised. In designing new infrastructure for this multi-storey hospital building, sustainability was a consideration. This substantial project has proven that large-scale institutional buildings can be retained in a way that successfully implements strict heritage requirements and improves the buildings environmental performance.



The Queen Mary Nurses Home, Camperdown, Sydney now the Queen Mary Building student housing. Photo by the author

Respect for Older Buildings

The American architect Harry Weese, who restored the Auditorium Theatre in Chicago, noted that the valid case for preservation is an economic one, asking “Can we afford to rebuild the environment every generation?”.

He believed that recycling of structures was not a sentimental exercise but a necessity, noting that old cities contained an enormous residual value of energy, packed into streets, utilities and buildings (Fitch 1990:32). This residual value was not only contained in the craftsmanship and the actual materials but also in the ‘time energy’ already expended.

The late James Marston Fitch:

argued that a respect for older buildings made environmental and economic sense. And he broadened the notion of what constituted important historical resources to include 'vernacular' buildings, structures like the 19th-century cast-iron industrial lofts of SoHo, which were not designed in high style yet spoke eloquently about the cultures that created them (Dunlap 2000).

In Australia the adaptive re-use of Federation era brick warehouses is the equivalent of New York's 'industrial loft' conversions. Originally designed for storage and in some cases manufacturing, their load bearing masonry external walls, hardwood columns, and floors designed to carry loads have proved eminently convertible; today containing a range of uses: shops or cafes at ground level, offices, apartments or hotels above.

Partly because of the fashion for New York loft conversions, warehouse conversions have become an accepted solution in Australia, successfully combining both sustainability and heritage. The Sydney-based architect Philip Thalys notes that the:

joy of great warehouses are their quality bricks, interesting roof trusses, good windows, timber structures and great positions (Williams 2014).

There is one other factor that has probably saved many of these buildings, in that they have greater site coverage than planning controls would today permit.

Recent research has charted the transition in construction of city commercial premises from the hardwood posts to the steel or concrete frames (Boyd 2015). Some of early experiments with new construction systems proved to not be as long-lived as the more traditional hardwood construction and have either been demolished or are languishing in the too-hard basket, as the structural problems associated with early concrete structures are much harder to solve.

Old Star / Green Star

The Green Building Council of Australia (GBCA) noted that the refurbishment of 39 Hunter Street, Sydney, completed in 2008, was the first heritage building to achieve a six star Green Star rating:

Tackling the fundamental problem of existing buildings is a key issue we need to resolve if we are going to reach our Kyoto targets and by taking on the challenge of converting a heritage building into a world leading example of sustainability, 39 Hunter Street has become a fantastic case study for what can be done in the world's CBDs - especially to those in the industry who still roll out the tired argument of cost and existing buildings (GBCA 2008).

Over the last decade a number of city buildings in Sydney have been refurbished to a five or six star Green Star rating, including the pair of warehouses known as the Bushell's Building in George Street, The Rocks. This project was the first NSW State Heritage Register building to be certified according to the Green Building Council of Australia's Green Star rating system. The Sydney Harbour Foreshore Authority (SHFA) has included sustainability in its standard Conservation Management Plan provisions, one of the first asset managers with a large portfolio of heritage items to do so.

Sensitive upgrading of individual areas of the Sydney Opera House have demonstrated that it is possible to upgrade access and to improve energy efficiency yet retain the integrity of the architects' design intention within a World Heritage listed complex. The concept of permitting carefully controlled upgrading to ensure that the building continues to function well as a performing arts centre in a manner that is consistent with original design intent is integral to the Conservation Plan for the Opera House. Whilst writing this paper, the Opera House was awarded a 4 star Green Star rating. The Minister for the Arts announced that:

The endorsement of the Opera House by the Green Building Council of Australia sends a clear message that green buildings don't have to be new – even the most recognisable and historic landmarks can earn a place among the most celebrated sustainable buildings in the world (GBCA 2015).

Craig Roussac in his article for the NSW Architecture Bulletin in 2009 entitled 'Old Star, Green Star' noted that the most sustainable building is the building that is already built (Roussac 2009). Yet the current rating tools barely mention the existing. The advantages of an Old Star are not only the embodied energy contained within the building fabric, in the design of both public buildings and residential buildings architects once had to pay considerable attention to ensuring that their designs were naturally ventilated and well lit. Contemporary published descriptions frequently went into considerable detail as to the method of ventilation.

Operational Energy Advantages

Understanding how a historic building functioned allows for what academics at the Mirvac School of Sustainable Development at Bond University in Queensland have termed 'Operational Energy Advantages', advantages that can be gained when adaptively reusing building stock, particularly buildings designed to be passively ventilated (Conejos et al 2011:8). For over a century the various Government and Colonial Architects across Australia designed public buildings without mechanical ventilation. English precedents were of little use in the heat and in many public buildings ideas drawn from other colonies were utilised to keep the rooms cool. Arcades and verandahs served a practical purpose, shading the wall of the main chambers. The remarkable series of Land Board Offices erected in country NSW from the early 1890s until 1910 being a case in point, raised ground floors, verandahs, air cooling, and sawdust filled walls were all used in an attempt to reduce the internal temperature. These buildings are still in use today as are a far cry from the air-conditioned shipping containers used in remote areas today.



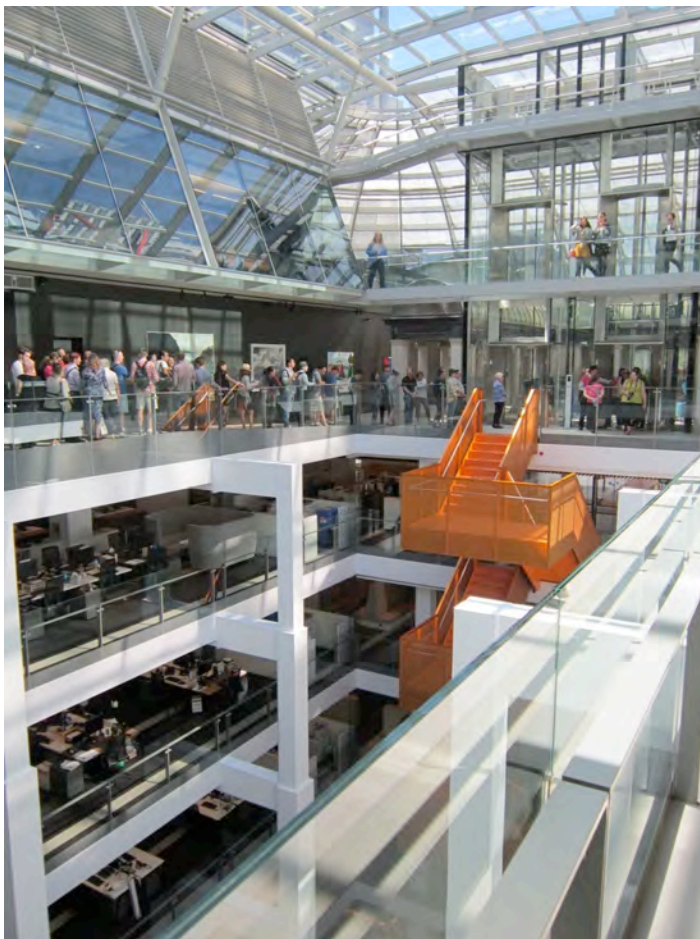
The recently reinstated roofscape of Glebe Town Hall. Photo by the author

Subsequent alterations to both public buildings and domestic residences in Australia have had an impact on environmental performance. In domestic residences verandahs have been infilled, early forms of roof insulation such as seagrass and roof vents have been removed, ceiling and wall vents have been blocked and chimneys (which also serve to ventilate rooms) have also been blocked. Likewise in public buildings, vents in walls and ceilings have been blocked, chimneys capped and roof vents removed. Few today understand how the ventilation of a public building operated as an entire system. In the recent upgrading of Glebe Town Hall the roofscape including the vents was reinstated. The heritage listing has been updated to include details of the ventilation revealed whilst researching the Conservation Plan. The ventilation tubing was found abandoned in the roofspace, showing how the system operated.

Conservation Management Plans have become too process orientated, and do not always contain sufficient analysis as to how the building was designed to function all year round. Far too much attention is paid to architectural style rather than analysis of how the building operated in terms of daylighting and ventilation. If Conservation Plans identified how the original design

was intended to work in terms of environmental control, and contained policies to recover this intention, the removal of later modifications would allow buildings to perform largely as intended, providing energy savings and health benefits such as fresh air and daylighting.

Recent projects in Sydney have reaped the benefit of analysis of how the building was designed to function in terms of daylighting. At 50 Martin Place analysis of the changing configuration of the building since its completion in December 1928 revealed that it had been designed with two light wells, one to light the through site lift foyer via a decorative glazed roof and the other through the centre of the building to provide light to the office floors. The idea of a central light well has been reintroduced, bringing daylight down into the centre of the building. This multi award-winning adaptive re-use project achieved a six star Green Star rating.



Central lightwell of 48 Martin Place that brings daylight into the centre of the building. Photo by the author.

In other developer-led city projects little heed was paid to how the original design functioned. The Trades Hall in Goulburn Street was built in a series of stages. The resulting E-shaped building included light wells containing naturally ventilated sanitary areas accessed by passages from the main corridor. This layout was replaced by a more conventional office block with a central atrium, which now requires a higher level of artificial lighting and air conditioning.

The Sydney City Council has been proactive in seeking to retain the form of buildings. Lightwells that provided natural daylighting are one of the specific features identified in its Schedules of Environmental Heritage. Council has recently undertaken a study to identify additional historic industrial and warehouse buildings within their local government area. All of these buildings are capable of adaptive reuse. The recent heritage listing of the Calidad building in Woolloomooloo designed by Ian McKay in 1974 makes specific mention of its environmental qualities, its excellent natural lighting and ventilation and the use of local materials. Inclusion of McKay's design intent in the listing will help to ensure that proposed changes are assessed for their impact not only on significant fabric, but also on the building's passive environmental design.

Urban Conservation Areas

In her paper on the conservation of 20th century urban fabric Jenny Faddy noted that it was disappointing that no heritage policy or legislation in NSW which embodied the concept of sustainability (Faddy 2011:1). One recent area of success has been in the enshrining of the urban conservation areas into the standardised LEP schedules of environmental heritage.

Urban conservation areas were introduced in Sydney in the 1970s, with Glebe and The Rocks being amongst the first examples. Many of the buildings in these areas are not heritage items but are deemed to be contributory and are to be retained. Sydney City Council has recognised

that the creation of conservation areas in inner suburbs contributes towards a sustainable city however overall heritage is still missing when it comes to planning for a sustainable future. The 10 objectives of the Sustainable City 2030 make no mention of heritage.

The retention of well built, well lit and well ventilated building should be encouraged, as such buildings cost less to run but also have benefits for the health and wellbeing of the day-to-day users. Scottish Heritage notes that:

Many traditional buildings were designed well for health in terms of ventilation, heating and natural lighting. The challenge is refurbishing them to an energy-efficient standard that maintains and promotes their health benefits. (Hobday 2011: 21).

and

Rather than refurbishing older building types to match the conditions now required in new ones, a more sympathetic approach might both save energy and provide a healthier indoor environment (Hobday, 2011:21).

Since the 1970s redundant buildings in country towns across NSW have been sold, former schools have been converted into residences; post offices and banks have become cafes, restaurants, real estate agencies or Bed & Breakfasts. These conversions help to retain the individual character of country towns, finding new uses for substantial but now surplus building stock.

It is a shame that the banks in particular no longer invest in regional property as they did in prior to World War II. The standard of premises erected is no longer integral to their corporate identity, the design of branches no longer symbolises solidity and permanence. Banks have moved out of, and sold, heritage buildings across the country, in cities, suburbs and in country towns. In checking the status of buildings on the NSW Chapter of the Institute of Architects

Register it is heartening to see the number of country banks that have been retained and reused. The quality of their initial design and frequent use of masonry in their construction has seen their widespread reuse. Most country post offices and banks contained a substantial flat for the bank manager or postmaster, making the building suitable for reuse.

A National Priority

As Robert Bevan pointed out in the Financial Review in 2008,

Demolishing buildings should be a last, not a first resort. The mounting environmental cost of wasting embodied energy should make us take heritage seriously (Bevan 2008).

When a building is heritage listed, the starting point is retention. It is however becoming increasingly difficult and time consuming to get items listed. By considering embodied energy costs and how a building was designed to operate in terms of environmental control in heritage listings and conservation plans, local councils and property owners might come to better understand range of longer term benefits that can be obtained from adaptively re-using existing building stock.

English, Welsh and Scottish Heritage all promote sustainable heritage. Historic Scotland is leading the way in terms of guidelines and technical papers. In her paper on embodied energy considerations for existing buildings Dr Gillian Menzies argues that:

The sustainable use of existing buildings must be a national and global priority.

Replacing a building has significant energy, carbon and financial cost implications. A new building would have to use many times less energy than the existing one to justify this energy and carbon investment. Retaining the existing building stock is preferred where its energy performance is good or can be improved to appropriate levels.

Retaining existing buildings and seeking to enhance their energy performance in

sensitive ways is in keeping with building conservation, sustainability and progress towards a low carbon society (Menzies 2011: 35).

Australian research into improving the implementation of adaptive re-use strategies for historic buildings likewise stresses that this issue is:

important to the national interest as destruction and reconstruction brings with it higher energy impacts (evidenced principally as embodied energy) that collectively impact on Australia's ability to meet its emission obligations (Conejos et al 2011: 8).

Conclusion

In our cities and towns a more sustainable approach would be to seek to re-use a building capable of being adaptively re-used whether a heritage item or not. Heritage professionals need to enter into the sustainability debate; the well-established conservation planning process can also become a useful tool for implementing the 3 L's: long life, loose fit, low energy and a tool for identifying 'Operational Energy Advantages' that were part of the original design intention when passive environmental control and good daylighting were the norm.

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