

## **Sustainability and Heritage Practice Note Series**

### **Practice Note 1 : Built Environment**

#### **1 Purpose**

Practice notes are for all heritage practitioners and other organisations and individuals involved with conserving Australia's wide range of heritage places.

The purpose of this practice note is to promote the benefits and importance of the conservation of heritage places as part of the ongoing protection and sustainability of the world's increasingly scarce resources, and to promote recognition of the sustainability inherent in heritage practice.

This practice note is the first in a series of practice notes and it relates to the conservation of existing buildings and improvements to their environmental performance. Other practice notes will consider other aspects of sustainability and cultural heritage.

#### **2 Concepts**

##### **What is sustainable development?**

Sustainability involves integrating economic, environmental, cultural and social objectives in long-term development strategies to meet the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland 1987).

Sustainable development aims to reduce carbon emissions and utilise increasingly scarce resources in a responsible way. Conservation of existing cultural and natural heritage reduces environmental impacts by

- Minimising construction waste by reducing the demolition cycle, ensuring buildings are adapted and retained until the end of their useful life;

- Reducing carbon emissions by minimising the energy needed to demolish and reconstruct;

- Retaining the embodied energy of existing structures and landscapes, recognising the environmental cost already paid;

- Continuing the life of building materials that can no longer be sustainably sourced;

- Continuing to utilise buildings designed to operate using passive environmental control;

- Contributing towards maintaining a community's sense of place in a rapidly changing world;

- Continuing traditional skills and practices, many of which have low environmental impacts.

## Common Goals : Heritage Practice and Sustainability

Heritage conservation practice and sustainable development can have very similar objectives and the pursuit of one goal should not be at the expense of the other. Conserving and adapting heritage places can contribute to energy conservation and also reduces carbon emissions by minimising demolition and construction waste and the need for production and transportation of new materials.

## 3 Principles

Australia ICOMOS recognises the important relationship between heritage conservation and sustainability, and advocates the following principles.

- Conservation embodies the notion that cultural heritage value is an inheritance, and that conserving the environment allows these values and meaning to be passed on to the next generation, contributing towards a sustainable future;
- Conservation of heritage places helps maintain liveable places that communities identify with and provides positive and continuing economic, cultural and social benefits for communities;
- Conservation of heritage places contributes to the UNESCO Sustainable Development Goals, in particular Goal 11 - Making cities and human settlements inclusive, safe, resilient and sustainable and Goal 12 - Ensuring sustainable consumption and production patterns;
- The concept of sustainability and sustainable development follows an approach of conserving the environment and earth's limited resources, understanding cultural and social values and improving economic benefits for future generations. These principles are aligned with the Australian Burra Charter approach to heritage conservation, which stresses an approach of care and maintenance to the place rather than replacement of fabric, and adaptation involving minimal change to significant fabric;
- Incremental improvements, rather than wholesale change, should be an acceptable path to achieving sustainability outcomes, aligning with the *Burra Charter* approach of 'doing as much as necessary and as little as possible' (as outlined in the Guidelines to the Burra Charter)
- Conserving heritage places has positive cost, time saving and environmental benefits, minimising carbon emissions, reducing the consumption of materials and reducing the associated need for transport of demolition waste and subsequent disposal in landfill;
- Conservation can provide economic, social and environmental benefits to owners and developers, and can contribute to meeting increasingly stringent environmental ratings and regulations;

- Traditional building practices often use sustainable natural materials, frequently locally sourced and often renewable. Continuing these building practices:
  - Reduces the use of new materials containing chemicals that may be harmful in the long term;
  - Lessens the need for new materials that require high energy consumption in their production and high transportation cost;
  - Utilises or reuses materials until the end of their lifespan; and
  - Utilises materials such as timber that can be responsibly sourced.
- Conservation provides opportunities for those seeking to fund projects that are sustainable contributing towards corporate social responsibility and environmentally sound and ethical investment goals;
- Protection is from unnecessary or damaging types of intervention when retaining historic building fabric is good heritage practice. The aim is to improve energy efficiency, environmental benefits and safeguard cultural heritage values.

## **4 Considerations for Conservation of the Built Environment**

A fundamental question that should be answered in assessing the sustainability benefits of retaining an existing building or heritage place is “what would be wasted if this place were to be demolished”?

- Existing building stock has often been produced with low energy expenditure in terms of materials production and construction methods, and have usually been designed for a long life span. They are also frequently not so specialised that they become obsolete, rather their conservation can be in the form of adaptive reuse, following the “3Ls” of environmental sustainability – Long life, Loose fit and Low impact.
- Existing building stock often employs appropriate built forms and materials as well as passive environmental control, the choice of form and materials having evolved to suit the climate of the particular area in which they have been erected. Natural ventilation, cooling and sunshading provide long-term benefits in terms of lower energy usage.
- Traditional buildings (including heritage buildings) were often designed with passive rather than mechanical ventilation and may have the added benefit of the high thermal mass of masonry walls and chimneys. Supplementary heating or cooling can be provided however this should not be at the expense of, or reduce the efficiency of, passive means of environmental control. Rather, the how the building was designed to operated needs to understood in order that the supplementation can take full advantage of all the passive measures, thus limiting additional energy consumption.

- Heritage buildings often contain durable materials that are no longer able to be sustainably sourced and/or are now rare (eg marbles and granites, rainforest timbers). These increasingly rare materials can have a long lifespan if well maintained.
- Reports considering climate change and the building sector indicate that at least 50% of buildings that will exist in 2050 have already been built. Retrofitting or refurbishing existing buildings is one of the cheapest and easiest opportunities for delivering reductions in carbon emissions. Carl Elefante's advice that *The Greenest Building Is...One That Is Already Built* is particularly applicable to heritage buildings. The greenest buildings are well managed existing buildings. (Elefante 2007)

## 5 Future Directions

Accurate research is currently lacking to inform the performance of some traditional materials. Having detailed figures for performance will help in arguing for retention of existing buildings.

- Funding is needed to progress Research and Development of the actual thermal performance of materials found in heritage structures, which may out-perform simulations. In the UK it has been found that, in the case of stone or brick solid wall construction, these materials actually perform much better than broad brush modelling suggests.
- Research and development into the life cycle characteristics of materials in heritage structures is also needed, to inform life cycle analysis (a critical aspect of assessing the carbon emissions of materials and structures);
- Research and development into quantifying the embodied energy inherent in heritage structures is needed. This research would then allow for the inclusion of the loss of this embodied energy as environmental cost;
- Development of new materials and technologies that could provide effective environmental upgrading solutions without compromising heritage significance in structures should be pursued.

More work is needed by heritage practitioners and ratings authorities to broaden the scope of existing 'ratings tools', and to influence and change government practice and policy to adopt a holistic approach for the inclusion of incentives that lead to sustainable conservation outcomes at all levels of government. The approach to be adopted for the built environment should also be in line with the UN Sustainable Development Goals (SDGs) and internationally set targets for 2030.

It is highly desirable that heritage sites retain their significance through continuing to be valuable and useful elements in the urban landscape. A broadening of the data utilised in rating systems to include the environmental benefits of retaining existing building stock is needed.

- At present there is no single environmental rating tool that includes the environmental or embodied energy benefits of conserving and/or adapting heritage buildings.

- The existing rating tools fail to recognise the broader environmental benefit of retrofitting existing buildings and therefore encourage a constant cycle of demolition and rebuilding over retention and adaptation of existing buildings. Factoring in the full environmental cost of new construction, rather than focusing on operational energy use will assist in shifting the current bias that favours constant cycle of rebuilding over retention.
- Australia's heritage places, urban landscapes and conservation areas are an invaluable sustainable resource considering their embodied energy. Acknowledgement of this would provide an incentive for conservation of the built environment and would assist in meeting the internationally recognised 2030 Sustainable Development Goals that Australia has committed to achieving. [www.un.org/sustainabledevelopment/sustainable-development-goals/](http://www.un.org/sustainabledevelopment/sustainable-development-goals/)
- Heritage bodies should add their voice to calls for the promotion of energy efficiency and emissions reduction through the sustainable use and adaptive reuse of buildings.
- Consistent incentives are needed to encourage energy efficiency and emissions reduction in the existing building stock in Australia. It is not acceptable that the existing building stock be considered obsolete or perceived as having decreased in value because of the manner in which the sustainability benefits are currently being measured in ratings systems.

## 6 Implementation of sustainability in conservation practice

The management of the Cultural Significance of heritage places should be both carefully considered and documented. Changes to heritage places undertaken with the aim of reducing carbon emissions and improved building performance should be carefully thought through to avoid adversely impacting on heritage values.

- Retention and improvement of existing passive ventilation, sunshading, heating etc should be part of the analysis of existing building fabric;
- Incremental progress towards achieving sustainability objectives may be necessary to achieve the best outcome, so that monitoring can occur to guide the best performance measures;
- All available measures for conserving and/or reusing valuable existing material should be considered in addition to using sustainable new materials (ie Forest Stewardship Council FSC certified timber, recycled aggregate concrete, etc);
- Interventions that could be considered, depending on the significance of the site, could be

Prevention of air leakage to/from the building structure without compromising the ability to open windows when required;

Introduction of passive cooling and increased ventilation and the ability for users to control ventilation;

The careful introduction of new sustainable or renewable energy sources (eg solar, geothermal, wind);

Implementing rainwater collection measures including the introduction of non-potable water / greywater harvesting;

Insulation of services pipes/ducts to prevent freezing, heat loss or temperature increase;

Provision of adequate insulation to reduce loss of heat and prevent heat transfer through roofs, walls and floors without sealing the building, thus allowing the building to breathe and preventing excessive moisture build up and mould growth;

Improving the performance of individual building components such as the use of solar glass, vacuum glass, thermal insulating shutters, where these could have a minimal heritage impact in a conservation project;

Controlling sun access and sun shading to limit heat build up or utilising the heat from the sun and thermal mass to heat an internal space (depending on the climate zone).

Case studies that illustrate the adaptation of a range of existing buildings can be found on the Green Building Council of Australia's (GBCA) website <https://new.gbca.org.au/>

## 4 Resources

### Primary Resources

*Our Common Future, Brundtland Report, World Commission on Environment and Development, 1986*  
World Commission on Environment and Development (Brundtland Report) 1987, Chapter 2: Towards Sustainable Development.

The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance. 2013.

*The Greenest Building is...One That is Already Built* by Carl Elefante, Forum Journal, the Journal of the National Trust for Historic Preservation, Summer 2007, Volume 21 No. 4

UNESCO Sustainable Development Goals, <https://en.unesco.org/sdgs>

### Other Resources

Australia ICOMOS Heritage Toolkit, which can be accessed at  
<<http://australia.icomos.org/resources/australia-icomos-heritage-toolkit/>>

[https://australia.icomos.org/wp-content/uploads/Sustainability-and-heritage-bibliography\\_MARCH-2015.pdf](https://australia.icomos.org/wp-content/uploads/Sustainability-and-heritage-bibliography_MARCH-2015.pdf) (ICOMOS Energy and Sustainability Bibliography)