

PART 4. STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY







4.A PRESENT STATE OF CONSERVATION

Comprehensive statutory and associated frameworks are in place across three levels of government to ensure that the present condition of the property is maintained to an exceptional standard. These frameworks ensure that the distinctive character of the Sydney Opera House and the identified heritage values of its various components will be retained when appropriate changes are undertaken to the property. The property is maintained and preserved through regular and rigorous repair and conservation programs, as well as by scrutiny at the highest levels including the executive of the Sydney Opera House Trust and the Australian and New South Wales Governments. The Sydney Opera House is listed as a heritage place on national, state and local government heritage lists and registers which ensure it is protected under the various laws detailed in Part 5.B. A comprehensive conservation management plan (now in its third edition) has been developed by one of Australia's leading heritage consultants – James Semple Kerr's *Sydney Opera House: a plan for the conservation of the Sydney Opera House and its site* (referred to as 'the Conservation Plan (SOH)' in this nomination).

The Sydney Opera House was conceived in the spirit of achieving excellence in all aspects of its presentation and celebration as a focal point of a city and a nation. All elements of the building and the site are currently in good physical condition. For instance, carbonation and chloride testing of the precast granite and concrete exterior wall panels and the in situ concrete external structural walls of the building indicate that the concrete is in good condition. In addition, consistent with best practice in 21st-century building conservation, alternative sources have been located to replace original materials that are no longer available (such as the shell tile lids and reconstituted granite used on the building exterior).

The full suite of conservation and monitoring measures are detailed in Parts 5 and 6. The present condition of the various elements of the property and baseline data to monitor its future conservation are provided in the Conservation Plan (SOH) and the Building Condition Indices. These are discussed below (Parts 5.E, 5.G, 6.A and 7.B).

4.B FACTORS AFFECTING THE PROPERTY

4.B (i) Development pressures

The site of the Sydney Opera House provides substantial natural protection from development. The building is located on a promontory in Sydney Harbour, with water on three sides and the Royal Botanic Gardens to the south-east. The legislation creating the World Heritage buffer zone will give further protection to the property by requiring that developments proposed within the buffer zone do not adversely affect the World Heritage values of the Sydney Opera House. The buffer zone and the legislation are discussed in detail in Part 5.D.

There are demands for the Sydney Opera House to maintain its position as a state of the art performing arts centre. Occasional adaptation to the property is necessary to allow the Sydney Opera House to meet the technological and clientele requirements of a national and world-class performing arts centre. At the same time, the aspiration for functional excellence can complement and reinforce the performance arts aspect of its heritage significance. The Conservation Plan (SOH) emphasises the need to balance the different roles of the Sydney Opera House as a monument and a successful performance venue. Legislation and associated conservation mechanisms enable these twin objectives to be achieved in ways that preserve the property's heritage values. All changes to the building and the site are undertaken within a rigorous conservation planning framework.

The recent building works to the Sydney Opera House have been undertaken in accordance with the Conservation Plan (SOH) and the *Sydney Opera House Utzon design principles 2002* (Utzon Design Principles). This has ensured that the current improvements retain the authenticity of the building as a performing arts centre. Substantial work has been undertaken by the Sydney Opera House Trust and relevant New South Wales Government agencies to define an appropriate framework for both the day-to-day and the long-term conservation of the Sydney Opera House.

4.B (ii) Environmental pressures

The Sydney Opera House is exposed to several environmental pressures but the means for managing their effects are in place.

Sydney is located on the south-eastern seaboard of the Australian continent facing the Pacific Ocean and is subject to 'El Niño' climatic effects. Over recent years,

Sydney has experienced reduced rainfall patterns but this has not had a measurable effect on the building. In its exposed position, the Sydney Opera House can also experience strong winds, with the strongest recorded being under 180 kilometres per hour. The building was designed to withstand wind loads of this level and higher. Pioneering wind-tunnel technology was used to test wind pressures during the construction of the building.

The Sydney Opera House is subject to a combination of environmental influences due to its exposed harbour-side location. These include salt water, wave action, high winds, atmospheric pollutants and solar radiation particularly in relation to the large roof and glass wall areas. The in situ and reinforced concrete structure of the Sydney Opera House, with its tile-clad shells and precast reconstituted granite-clad podium, is vulnerable to the problems of concrete decay typical for a building in a maritime environment. Exposed concrete poses specific technical challenges because the surface finish and the structure are integrated. Also, concrete repair is physically invasive and can have a significant visual impact if not managed carefully. Sophisticated testing and repair programs are in place to ensure that the concrete elements remain in excellent condition. These programs are discussed in Part 6.A.

Conservation challenges arising from environmental pressures have been comprehensively identified and managed at the Sydney Opera House. The original materials chosen were of a very high quality (such as the glazed tiles, concrete and bronze used in the handrails) and sophisticated construction techniques were used. A proactive and rigorous building maintenance program is in place to deal with the critical areas of material risk. Each critical item (such as the concrete, reconstituted pink granite, tiles and the bronze) has a conservation program identified



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and implemented by on-site contractors engaged specifically to maintain critical building fabric to a high standard. For example, in order to minimise environmental effects on the exposed concrete it is steam cleaned annually to remove the organic growth that would otherwise contribute to the breakdown of the surface and facilitate the passage of water and oxygen through the concrete. Treatment methods have been carefully developed to minimise secondary risks from the treatments themselves. Changes in local environmental conditions are also carefully monitored for their effect on the property. Sydney's recent low rainfall has meant the infrequent natural cleaning of the tiles by rain, resulting in an unusual accumulation of atmospheric soiling and dulling of the tiles. The tiles have been washed to counter this visual effect and to maintain the shiny surface finish of the shells.

4.B (iii) Natural disasters and risk preparedness

The Sydney Opera House is located in an area not generally prone to natural disasters such as cyclones, earthquakes or floods. In 1989 the building did not show any damage following a 5.6 Richter scale earthquake in Newcastle (300 kilometres north of Sydney). Nevertheless, as a consequence of heightened awareness of earthquake risk, new Australian standards for building construction have been introduced. Between 1996 and 2003 the fixings for the external cladding panels were upgraded to meet the Australian standard for earthquakes.

Consistent with international best practice, risk management is comprehensively embedded in the administration and management of the property. A number of documents have established protocols and procedures to identify and deal with a wide range of potential risks. The following are examples:

- The Sydney Opera House has comprehensive emergency and integrated security plans in place to manage and respond to unforeseen emergency situations. The plans comply with the *State Emergency and Rescue Management Act 1989* (NSW) and the Australian standard for risk management.
- The Conservation Plan (SOH) identifies current and foreseeable risks to the heritage values of the Sydney Opera House and specifies policies that seek to avoid or minimise these risks.
- A *Heritage risk management policy* and a *Heritage risk management plan* are currently being developed by the Sydney Opera House Trust. The documents identify foreseeable risks and strategies for maintaining the heritage values of the property. They form part of the *Management plan for the Sydney Opera House 2005* discussed in Part 5.E.

Figure 4.2 Conservation works to the tiled shells

Figure 4.3 A program of detailed investigation and research was undertaken in 2003–2004 to develop a suitable method for cleaning the exposed concrete. This included historical research and sourcing of equipment used in the Sydney Opera House construction as demonstrated here by Steve Tsoukalas who worked on the Sydney Opera House in the 1960s.

Figure 4.4 Surfers assembling on the forecourt for the Australia Day surfboard challenge, 2004. The Sydney Opera House provides for a huge variety of functions, all overseen by the various management strategies in place.

4.B (iv) Visitor/tourism pressures

The Sydney Opera House is one of the most popular visitor attractions in Australia. It is featured in promotional materials prepared by Tourism New South Wales and Tourism Australia as a symbol of the city of Sydney and an emblem of Australia. More than four million people visit the site each year and it is estimated that this figure will increase by approximately 4.5 per cent per annum.

Research into site visitors and a review by tourism industry professionals have led to strategic planning to address the estimated increase in visitors. Initiatives under consideration include the provision of a visitors' centre and an information booth. The expected increase in visitation is not expected to have any negative impact on the heritage values, given the size of the Sydney Opera House precinct and the management strategies being implemented.

4.B (v) Number of inhabitants within the property and the buffer zone

There are no inhabitants within the property. About 650 permanent, part-time and casual staff work at the Sydney Opera House. An estimated 5500 residents live within the buffer zone (Australian Bureau of Statistics 2003) and a larger number of people work within this area of the city.