

Decarbonising Infrastructure Delivery

Reusing and repurposing assets: Walsh Bay Arts Precinct



Summary

Walsh Bay Arts Precinct preserves cultural heritage whilst reducing the carbon associated with creating 7 new theatres, studies, and rehearsal spaces through adaptive reuse of existing assets. Two historic piers were redeveloped to create a modern arts and cultural hub.

The NSW Government redeveloped Pier 2/3 from an empty wool store to a premium 21st century space for theatre and music performance. Combined with Wharf 4/5, the premier arts precinct delivers a new home for making, performing, and experiencing theatre, dance, and music on Sydney's waterfront.



- Delivery agency:** Infrastructure NSW
- Delivery partners:** Richard Crooks Construction
- Project stage:** Complete (2021)

Repurposing of existing Walsh Bay wharfs and piers

The project consisted of redeveloping Wharf 4/5 and Pier 2/3 of the Walsh Bay Wharf in Sydney. Wharf 4/5 involved preserving both the existing state significant heritage structure and elements while delivering purpose-built facilities and performance space with the latest technology.

Pier 2/3 was the second stage of the NSW Government's redevelopment of the precinct. It consists of a distinctive timber wharf originally constructed in the 1920s. Pier 2/3 attained heritage status in 1999, which was preserved during the development. Pier 2/3 required large sections of the roof to be raised to increase usable performance space and accommodate the required lighting and sound equipment.

Implementing initiatives across the Carbon Reduction Hierarchy

In line with a key principle of the [NSW Decarbonising Infrastructure Delivery Policy](#), the project demonstrates how reusing structural elements can help to reduce carbon across the infrastructure lifecycle (the Carbon Reduction Hierarchy).

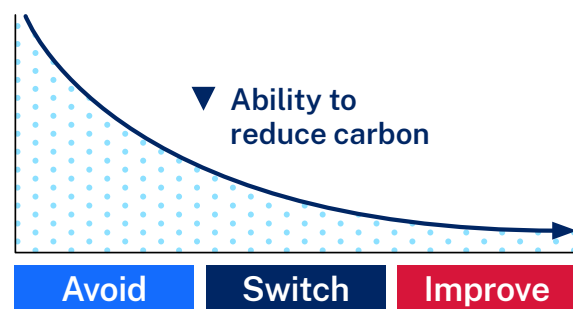


Figure 1 | Carbon Reduction Hierarchy (adapted from PAS 2080:2023)

Avoid the need for infrastructure

Reuse and refurbishment of existing pier and wharf

Heritage fabric has been carefully protected during construction and substantial remediation works have been undertaken to repair, reinterpret and preserve these heritage-listed buildings.

Reuse of materials

Wharf timber was salvaged and re-milled, reducing the need for new materials. Additionally, the heritage cargo doors were retained, and over 230 heritage light fittings were refurbished and reused throughout the pier. Some of the superfluous hardwood floorboards were recycled into joinery units in common spaces and used by tenants.

Switch to low carbon options, materials and technologies

Rooftop solar photovoltaic system 1,211 solar panels were installed providing 490kW capacity with provisions in place for future battery power storage.

Seawater heat exchange A seawater heat exchange system was installed utilising the stable temperature of seawater to reduce the energy required for heating and cooling compared to traditional systems. Besides being more cost efficient over the life of the system, it has a lower visual impact.

Avoiding the need for network water supply and

associated energy use The roof area of over 6,500m² allows for rainwater harvesting and reuse for sanitary applications on Wharf 4/5. 70,000L of rainwater storage is provided under the wharf. Supply is monitored by the Building Management System, switching to fresh water if required to ensure continuity of service.

Improve through adopting solutions that improve resource efficiency and circular economy outcomes

Design for adaptability A new 'Skyfold' door, retractable and flexible seating banks, loose and modular seating and removable balconies and walkways were installed to create flexible stage size and seating configurations, and provide adaptable future-proofed performance spaces.

Energy efficiency By locating the theatre spaces and offices at the centre of the building in sealed compartments, the area requiring air-conditioning is reduced, improving energy efficiency. This also reduced the need to achieve a level of airtightness of the original heritage skin of the building to support efficient heating, ventilation and air conditioning operations.

Challenges and lessons learnt

The complexity of building state-of-the-art theatres in 100-year-old timber wharves meant many unique structural and fire protection solutions needed to be developed.

The heritage timber structure had significant hidden and unidentified structural damage, including dry rot and termites. The deteriorating condition of timber substructure provided constant logistic, structural and financial challenges and necessitated replacing, repairing or supplementing damaged substructure members with new steel or timber members.

The physical difficulty of safely installing large and heavy elements in confined areas over water complicated this process. The engineers developed creative load-bearing solutions to get maximum capacity out of the existing floors and conducted extensive load tests to determine the real load-bearing capacity of the piles and identify where strengthening work was required.

However, conscious effort to incorporate sustainability practices throughout construction and operations helped to mitigate the effect of additional emissions associated with the need to develop custom structural solutions.



1,211
Solar
panels



70,000L
Rainwater
storage



50 Years
Minimum
extended life



Over 230
heritage lights
fitted with LEDs



7 New
multifunctional
theatre spaces