

1200 Buildings ▶

CASE STUDIES

ROSS House

Ross House is in the early stages of its journey to sustainability. An Opportunities Report was commissioned in 2008 to explore ways to improve its energy and water performance. As a follow up Ross House Association has engaged a reputable consultant to develop an Environment Management Plan.



Built

1897 (Heritage listed)

NLA

2120 m²

Tenancy

6 storey office building consisting of basement (car park), a small retail shop on the ground floor, 5 office floor levels and a roof plant room.

Building owner

Ross House Association

Property manager

Ross House Association

Refurbishment project timelines

2009-2014

Project team

Building Environment and Amenities Sub-Committee
Hyder Consulting (Opportunity Report)
Arup (Environmental Management Plan)

NABERS Energy

Current: 2.5 (Indicative)
Target: 4.0 - 4.5

NABERS Water

Current: 5.0 (Indicative)

Key refurbishment features

The Opportunities Report recommended 15 changes. Thus far, those completed include:

- Installation of time-clocks for each instantaneous boiling unit
- De-lamping about 50 existing T8 twin light fittings
- Installation of light sensors.

Energy saving

Not yet determined

Water saving

Not yet determined

Greenhouse saving

Not yet determined

Project costs

A full implementation of the Opportunity Report, is estimated at about \$250,000. It is estimated that it will cost \$500,000 to meet NABERS Energy ratings objectives.

Annual saving

Not yet determined



History

This Heritage and National Trust listed building, located at 247 Flinders Lane, was constructed in 1898 as a grand six storey warehouse. Its contemporaries include Saint Patrick's and Saint Paul's Cathedrals and the Block Arcade.

The original Sargood importer warehouse stretched from Flinders Street to Flinders Lane, as part of the warehouse precinct that occupied this area. In November 1897, a fire completely destroyed the warehouse with damage estimated at £1,000,000. The fire also destroyed the entire block between Swanston and Elizabeth Streets, and Flinders Street and Flinders Lane.

Sargood engaged Sydney architects Sulman and Power to redesign the warehouse.

The building was designed as a brick structure using a Romanesque style, with giant brick arcades, metal oriel windows and parapet colonnade. It was a massive six storey structure, but unfortunately just as it was completed, another fire destroyed half the building on the Flinders Street side.

So, once again the building was restored, this time with fire sprinkler systems, fire-proof doors, a flat concrete roof and window drenchers. The oriel windows were also recessed as a fire prevention measure.

In 1931, the building was acquired by the State Electricity Commission of Victoria and converted to offices. In the mid-1930s, the Flinders Street half of the building was demolished and new offices built, but the Flinders Lane half was retained. It was named Royston House.

Ross House, as it was re-named, opened in 1987. The building was purchased through a substantial grant from the R.E. Ross Trust.

Since 1998, the building has been managed by the Ross House Association, which offers low rent to tenants; mostly small, independent community and self help organisations committed to social justice and environmental sustainability.

Its last refurbishment took place between 1985-87, during which all systems were upgraded, including the HVAC, which was converted from a centralised system to individual units on each floor.

Background

In 2008 Ross House participated in a pilot retrofit program run by the City of Melbourne in partnership with Sustainability Victoria, called the Building Improvement Partnership Program.

Hyder Consulting was appointed to review the building's operational efficiency and to recommend improvements.

Hyder Consulting released an Opportunity Report in 2008. It made a number of recommendations, which if implemented, could reduce greenhouse emissions by 22-34 per cent.

As the building is heritage listed, the Ross House Association (RHA) commissioned a Conservation Management Plan (CMP) so that changes could be made to the building while still meeting the heritage conditions.

This report was released in March 2011.



Objectives

The long-term objectives are to completely overhaul all systems, and to bring the building to at least a NABERS 4.0 star level.

In the meantime, the Building Environment and Amenities Sub-Committee are following the recommendations provided in the Opportunity Report, and implementing these where practical.

The tenants are unanimously supportive of the Association's objectives to 'green' the building, as they share the philosophical position of the management committee. The management would like to see the building at the leading edge of green design and operation.

Planning

The Opportunity Report is not a technical specification; it highlighted areas that needed upgrading or replacing, or where other cost savings can be made, so an Environmental Management Plan (EMP) was commissioned. The international sustainability consultants, Arup, have offered to produce an EMP at a cost rate, and the Ross House Association has just secured the funds from the R.E. Ross Trust to pay for this work.

The EMP will be the blueprint for greening the building, and will include big-ticket items such as replacing the HVAC, overhauling the lighting, installing sub-metering and a building management system (BMS).

The Building Environment and Amenities Sub-Committee will manage the process, and recommendations will go to the RHA management committee for final approval.

Depending on funding, it may be necessary to run the project over four years, and renovate a floor at a time.

Any refurbishment will also need to take into account heritage conditions. These were revealed in a comprehensive Conservation Management Plan (CMP).

Implementation

A number of the most accessible and easily implemented recommendations made in the Opportunity Report have already been completed. It is anticipated that other recommendations will be completed during 2011-12.

However, any substantial retrofit awaits an Environmental Management Plan and some of the Opportunity Report recommendations will not be implemented in lieu of the EMP.



Features

Building

Ross House is a five storey building with approximately 2120 m² of net tenable space.

As the building has to meet heritage conditions, there are limitations regarding changes to the building fabric. The façade of the building dates back to 1901, so there is a good deal of air leakage.

The CMP found that areas of primary significance include the Flinders Lane elevation (retaining its original masonry structure and window joinery), the bluestone entry stairs and the original internal window joinery. However, the CMP has advised that very few internal structures need to be preserved.

HVAC

Currently, the air conditioning system consists of Direct Expansion (DX) Air Handling Units (AHU's) located on each floor level, distributing conditioned air through two high level ducts into the office space.

Each floor level is divided into two zones, with individual AHU's, using DX compressors, serving each zone.

A single cooling tower rejects the heat from the AHU's via the circulating condenser water.

The heating water is currently supplied by one single natural gas fired boiler. The boiler was installed when the building was refurbished in 1986 and is located on the roof.

Other than regular maintenance such as keeping the duct work clean, there is no real way to significantly improve the HVAC energy efficiency. Time clocks allow the system to be automatically switched on and off, but it lacks other efficiency measures such as effective zoning, night refresh, economy cycle and variable air volume (VAV) fans.

The Opportunity Report recommendations included after-hours air conditioning control (not completed), variable speed drive (VSD) on cooling tower fan (not completed) and upgrading the existing time-clock to run toilet exhaust fan at different times to air handling unit (AHU) plant (not completed).

However, the current system has reached the end of its life-cycle, so it needs to be replaced, and the management has deemed it not cost effective to make piecemeal changes to the system at this stage.

The EMP, when completed, will provide options for HVAC system replacement.



Energy load

A tenant survey was conducted on how tenants use energy in the building, to get a sense of the energy load.

Heating relating to lighting is difficult to control as lighting is not provided office by office; there is a single electrical main retail supply meter for the office accommodation and car park areas. A second retail electrical meter serves the ground floor small retail tenancy shop.

The Opportunity Report recommended putting switches in each office, and this will be implemented in 2011 (budget permitting).

Domestic hot water is supplied by local electric hot water storage units located on the first and third floors for the male and female toilets at the south end of the building. Individual small electric hot water storage units are located on each floor serving the disabled toilets and kitchens on the north end of the building. Boiling hot water in each floor kitchen is supplied from local electric instantaneous hot water boiling units.

The Opportunity Report recommended the installation of time-clocks for each instantaneous boiling unit, and this has been completed.

Water

The Opportunity Report found that Ross House was already very water efficient with an unofficial 5 star NABERS Water rating, based on a 12 month period between May 2007-May 2008.

The Opportunity Report recommended upgrading to waterless urinals, which has been done and installing flow restrictors on all existing hand basin tapware, which has not yet been completed.

Waste

The tenants are encouraged to segregate waste into recyclable and non-recyclable materials, and the building cleaners empty these bins located at the end of the hall every day. Signs are provided to ensure tenants segregate their waste correctly, and management is hopeful that with the retrofit project about to commence, tenants will engage more with the whole greening exercise.

Environment

As the tenants of the building are focused on community and environmental causes, the Ross House Association staff engage tenants in environmental campaigns, calendars of events, and discussions about what to do with the building spaces, such as the foyer. This is all aimed at making Ross House a more inclusive and pleasant place to work.



Building management and controls

There is no building management system (BMS) in the building, and only one electricity meter for the whole building.

The HVAC system is run on time clocks.

The Ross House facility manager has created charts of energy and water use over recent years, and discussed with tenants ways to achieve less load on the system.

However, energy-reduction strategies are limited by the building systems and the lack of individual tenant controls, as it is not currently possible to split off individual floors or zones.

The Opportunity Report recommended installation of a simple small BMS to control air-conditioning services and possible lighting control. However, this will be re-evaluated in the the EMP.

It was also recommended that Ross House monitor and review ongoing energy and water consumption from invoice data on a monthly basis.

Challenges

The main challenge for the Ross House Association is raising the money necessary for a retrofit. As Ross House is a not-for-profit institution offering low cost rental space to community organisations, funds for refurbishment are not easy to generate, and the Association is seeking grants.

The estimated cost to bring the building to a NABERS 4.5 rating is approximately \$500,000.

The other challenge is ensuring that the building adopts, on the basis of professional advice, the most effective system that will meet the green objectives and tenant comfort at an affordable cost.



Outcomes

The outcomes for each of the following indicators is based on a very low base, and are viewed across the limited period from 2009-2010.

Energy

Not yet determined

Water

Not yet determined

Social

Not yet determined

Maintenance

Not yet determined

Commercial

Not yet determined

Overall

Not yet determined

Lessons

According to Steph Donse, Ross House Development Officer, making informed decisions when embarking on a project as costly and complex as a retrofit is crucial. For a heritage building such as Ross House, the Conservation Management Plan is very important, because it gives a comprehensive picture of the state of the building and what can and cannot be done within the heritage conditions. The work they will do with Arup in developing an EMP is the second part of this consultation process.

Seeking advice from reputable engineers and architects who will help find a unique solution has also been an important lesson, and this means doing research to find the right consultant, examining their experience and credentials and looking at the buildings they have worked with previously.

The future

The refurbishment process still lies ahead but the RHA hopes to have the EMP completed by the end of the 2010-2011 financial year and to begin the retrofit shortly after.