

# CH<sub>2</sub> Setting a new world standard in green building design

## Design snap shot 12: Western Façade

### Summary

#### Introduction

This summary discusses the design, visual appearance and factors that influenced the western façade of CH<sub>2</sub>.



Figure 1. Timber samples with its differing colours

#### Drivers and objectives

- To provide a responsive and sustainable sun shade system for the office, helping to increase the comfort levels of its occupants
- To reuse scraps of timber that would otherwise go to waste in the building industry
- Show how materials age over time and weather at different points on the façade

#### Costs and benefits

Alternatives would consist of systems such as those made of aluminium or steel. This would have a very high cost, and require considerable energy to manufacture (embodied energy). The timber façade was provided by Nullabor Sustainable Timber. It has a lower environmental impact, and also provides visual interest from people passing in the street.

The photovoltaic cells on CH<sub>2</sub> provide the equivalent renewable energy to power this shading system.

### Outcomes

The western elevation is bio-climatically responsive to the direct sunlight falling on the façade. The façade is controlled by the Building Management System informed by a solar clock and the weather station on the roof.

The facade movement is controlled by the Building Management System with a software program set to the sun's movement throughout the year, i.e. a solar clock. This automated system provides the ability to optimise the lighting/cooling balance, including dealing with difficult low-sun angles in winter.



Figure 2. View from the street artists impression (DesignInc Melb)

# 12 Western Façade

A semi-enclosed stair is also a feature of the western facade. This architectural stair is designed to encourage staff to use stairs rather than lifts and to provide access to outside air and better connectivity to the local environment, all while providing the necessary function of a fire stair.

## Lessons

Although the recycled materials are inexpensive, the workmanship and prefabrication costs should be accounted for.

Checking material availability (sizes and shades) is important to ensure that chosen patterns or designs can be provided without compromise or alterations.

Elements in the building can perform experimental/visual functions as well as practical function.

## More detail

### Timber louvres

The afternoon sun, shining from the west, can have a significant effect on commercial buildings in Melbourne, heating up the interior and creating glare in the office. For these reasons, CH2 has a louvre system covering the western façade, with the louvres able to move and 'track' the sun, responding to the internal light conditions.



Figure 3. Timber louvred façade to the west which reacts to external conditions and is powered by solar panels (DesignInc Melb)

The recycled timber has been sourced from old housing frames and other sources such as timber used in industrial facilities. It is made up of jarrah, ironbark, red gum and blackbutt.

The intention is that several of the rows of louvres will have each blade section from a different timber as an experiment on the natural ageing of these timbers. All the other sections will have a mixed timber composite blade. From Swanston Street, it will be possible to see the timber age and grey over time, and this will be mapped and recorded. The mix of timbers was decided on to minimise cost while still providing the visual education opportunity.

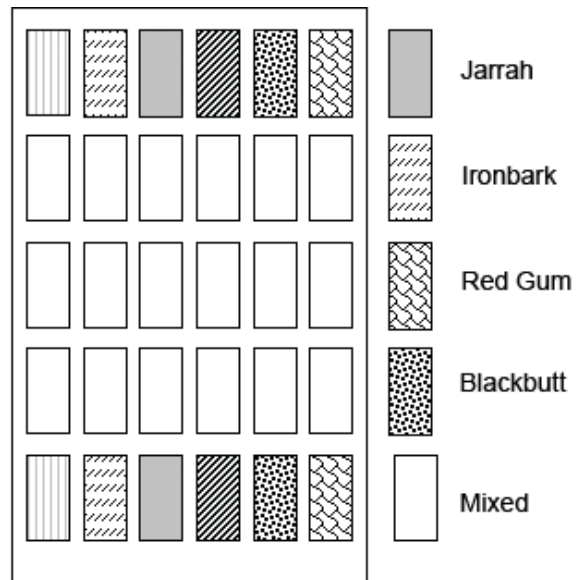


Figure 4. Representation of proposed timber map for western wooden louvre façade

The timber is recycled and joined in a way which allows the use of smaller pieces of timber.



Figure 5. Timber joint

## 12 Western Façade

The system planned for CH2 comprises a weather station that measures the amount of sun falling on the façade, wind direction and rain, and a solar clock to inform the BMS when to open and close the system. Further it was the intention that the solar photovoltaic array on the roof would produce enough power to offset the energy required to open and close the louvres.

### The semi enclosed stair

A semi-enclosed stairwell is a feature of the western façade. It is protected from the environment, but is still partly in the external air. This means that those using the stair have connectivity with what is happening outside, have access to external air and the life of the city. Similarly, from the street, there is a transparency and an opportunity in at least a small capacity to be connected to the Council's activities.

The design team wanted to include an architectural stair to encourage staff to use the stairs rather than the lifts to move between floors. However, a second fire stair was also needed; the design team met this challenge by integrating the two needs. As the stair is located externally it meets the fire rating requirements.

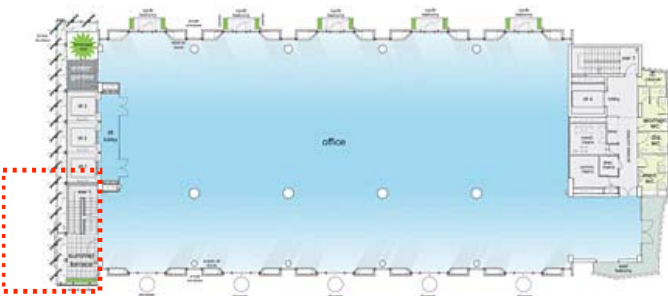


Figure 6. Semi enclosed stair to the west (DesignInc Melb)



Figure 7. Computer generated image of the western façade and stairs (DesignInc Melb)