



chapter 05

precedent study



CH2 Building

Melbourne, Australia
City Council Planners and Design Inc.
2006

focus: sustainability_systems approach_green star rating_passive design

Introduction

The CH2 Building was designed to imitate the planet's ecology, which is a complex system of interrelated components (City of Melbourne, 2005). Just as it is impossible to assess the role of any part of this ecology without understanding and considering the greater whole, CH2 comprises many parts that work together to heat, cool, power and water the building, creating a harmonious environment (City of Melbourne, 2005).

Brief

- a sustainable building
- an example to the city, i.e. a didactic process and building
- to be energy efficient, water conscience and specific in sustainable design
- to provide comfortable working environment

Design based on ecology and climate

A major focus of the design process for CH2 was to comprehend Melbourne's climate and weather patterns. "An ecosystem responds to its environment and its ability to adapt to take advantage of changing weather conditions contributes greatly to the success of the system" (City of Melbourne, 2005).

It was seen that responding to the site's climatic conditions revealed a range of opportunities for energy efficiency, resulting in some of CH2's most innovative features and systems.

"Melbourne is well known for its 'four seasons in one day'" (City of Melbourne, 2005). This provided an opportunity to design the building around the concept of cold energy storage. The building therefore operates in two seasonal modes, winter and summer, with the added consideration of conditions that operate as day mode and night mode.

*Fig.272: and
Fig.273:CH2 Building [Source: www.mel-
bourne.vic.gov.au/Environment/CH2]*



fig.57



fig.58



fig.59



fig.60

vertical green shading

Vertical greenery to balcony sides screen low angle sun + filter glare.

light shelf

Ambient and direct daylight bounces off external and internal light shelf.

shading

Light shelf + balcony floors provide horizontal shading from northern sun.

Internal upward rolling retractable blind controls high level glare.

timber screens

Manually adjustable vertically sliding timber screens block direct low angle sun and maintain views.

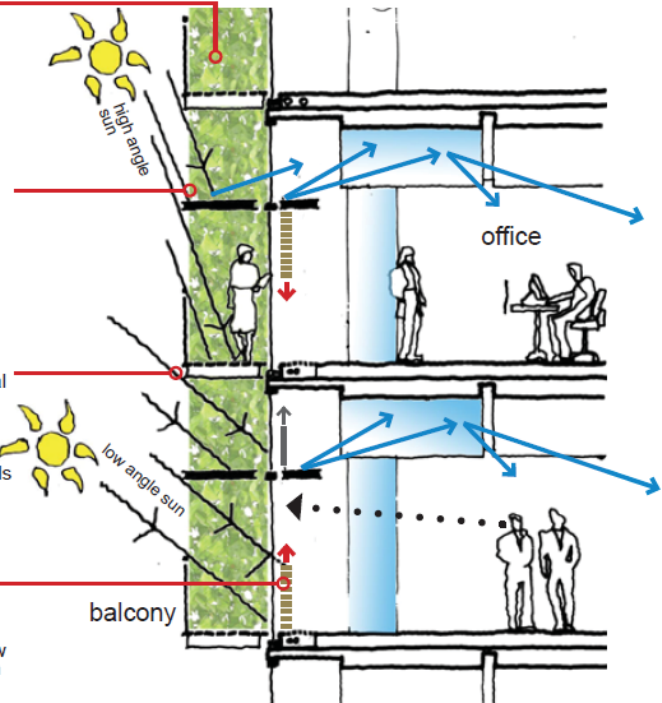


Fig.278:Lighting and Shading[Source: www.melbourne.vic.gov.au/Environment/CH2/]

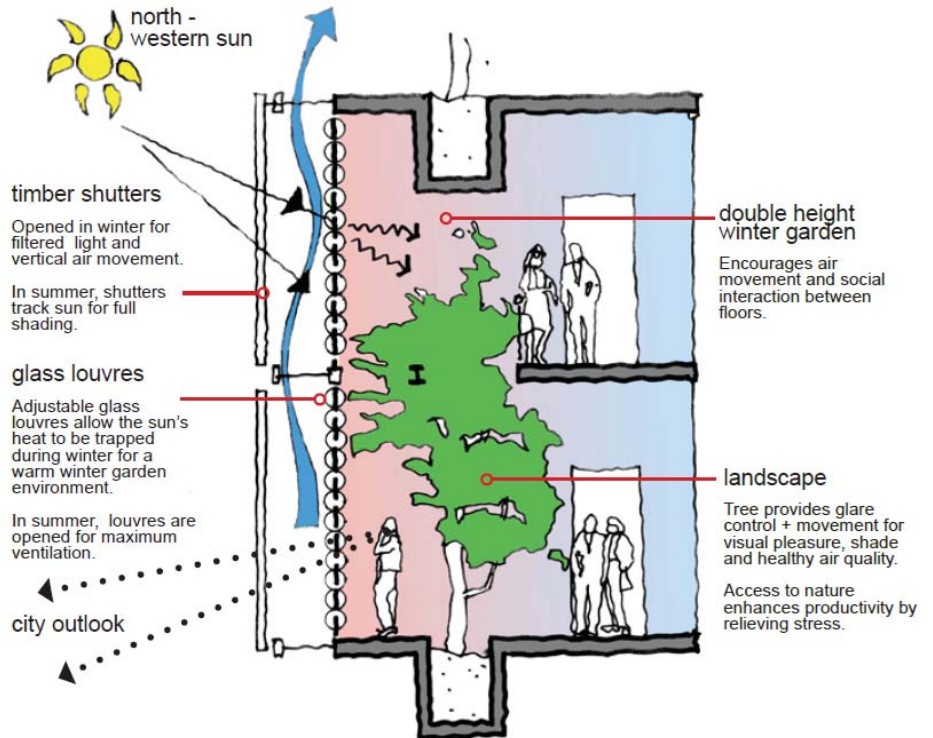


Fig.279:Timber shutters and glass louvres. [Source: www.melbourne.vic.gov.au/Environment/CH2/]

Fig.274:Vertical garden [Source: www.melbourne.vic.gov.au/Environment/CH2/]

Fig.275:wind cowl assisting in ventilation [Source: www.melbourne.vic.gov.au/Environment/CH2/]

Fig.276:and Fig.277:timber louvers [Source: www.melbourne.vic.gov.au/Environment/CH2/]

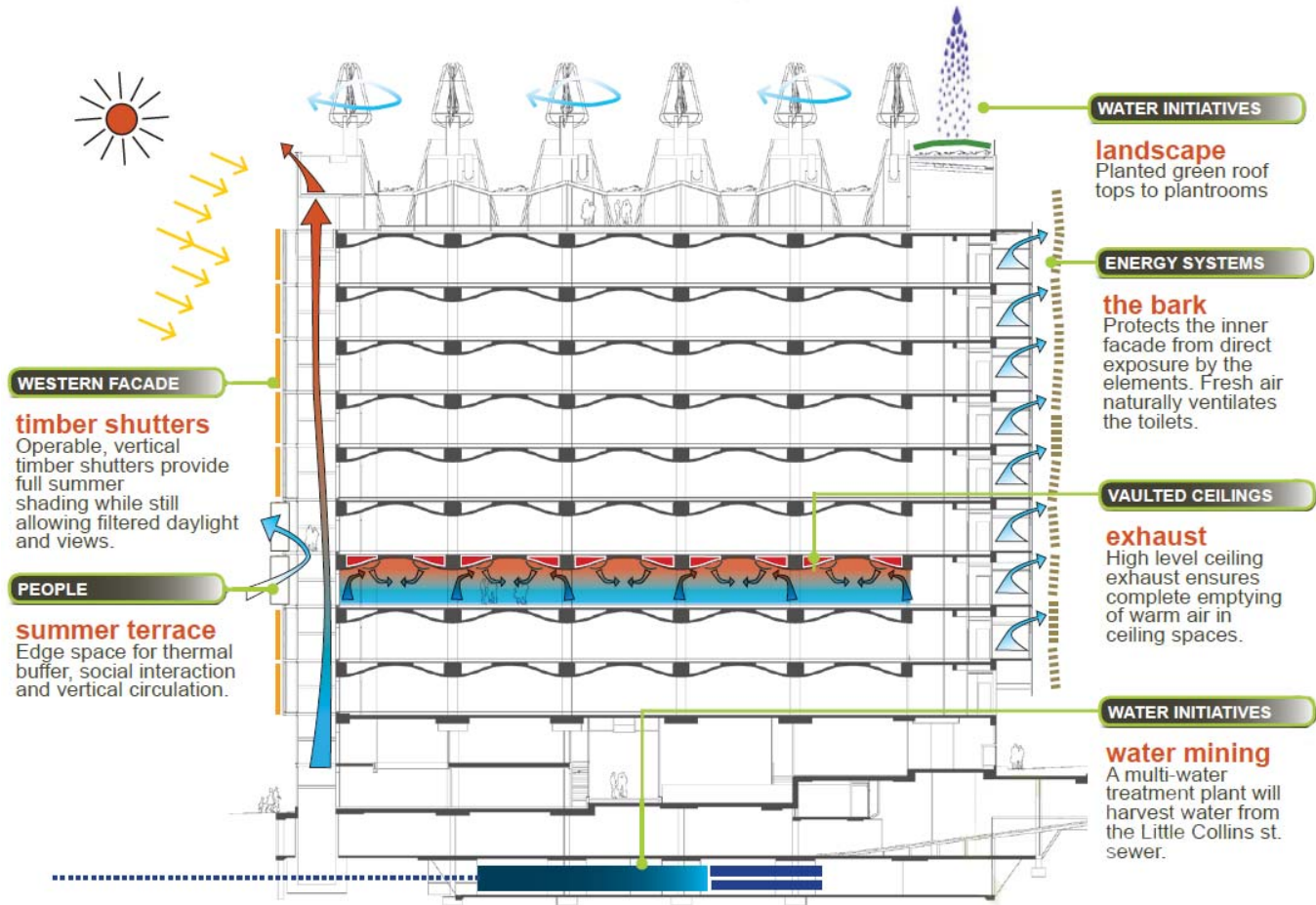


Fig.280:CH2 in Summer Mode [Source: www.melbourne.vic.gov.au/Environment/CH2/]

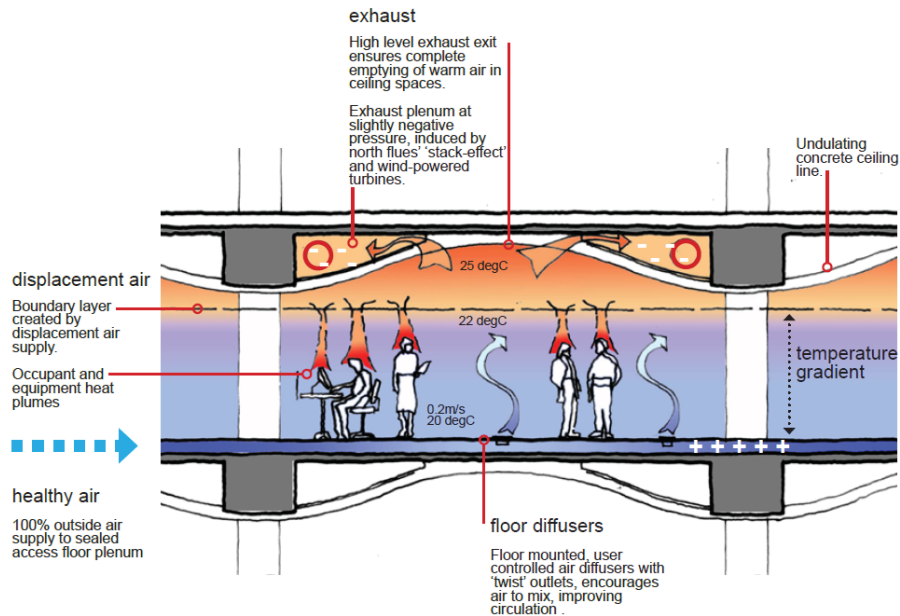


Fig.281:Heating and Cooling through the Ceiling[Source: www.melbourne.vic.gov.au/Environment/CH2/]

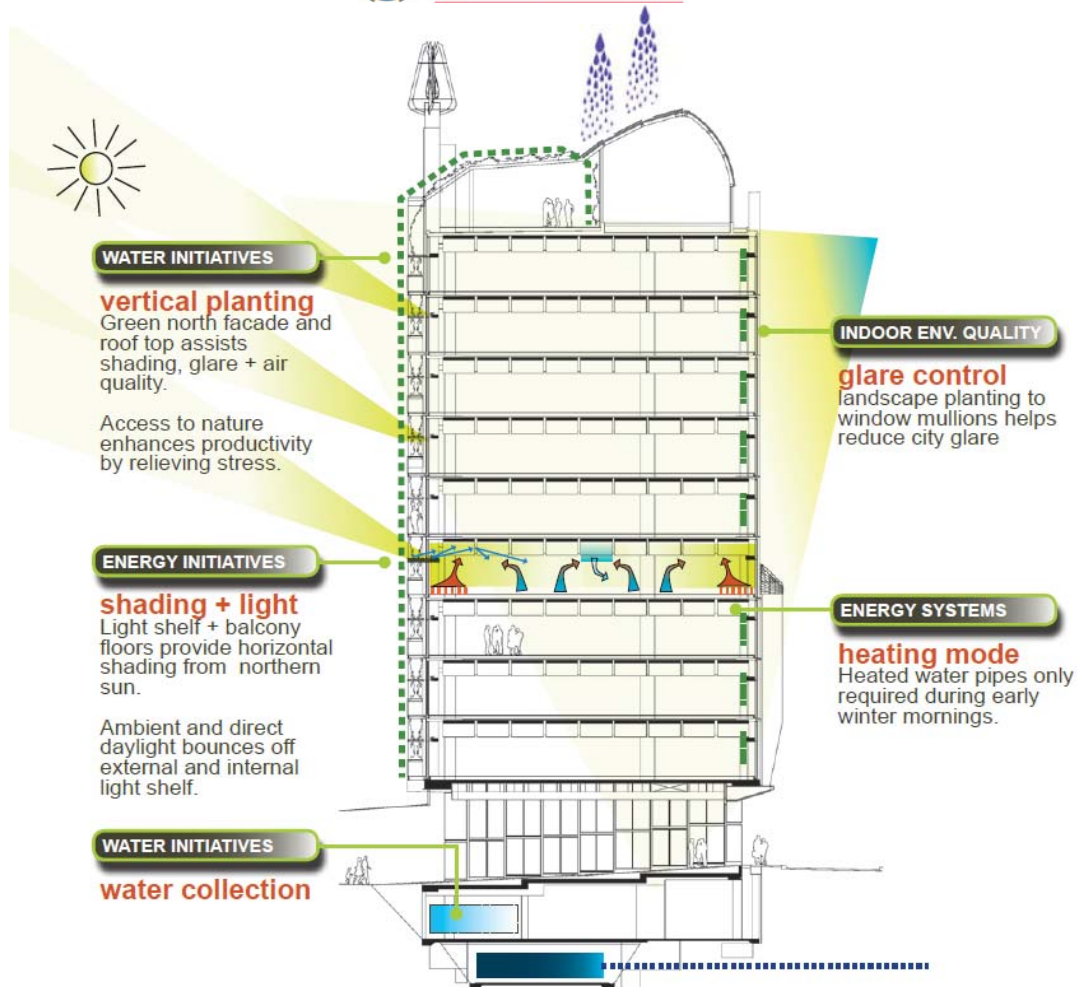


Fig.282:CH2 in Winter Mode [Source: www.melbourne.vic.gov.au/Environment/CH2/]

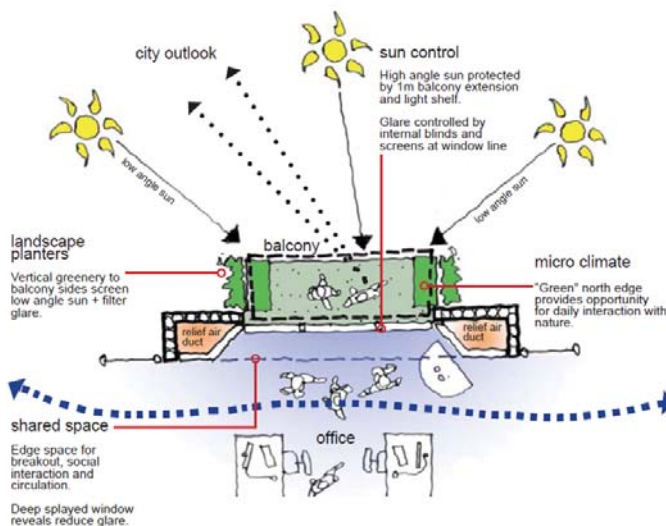


Fig.283: Vertical Garden and Balcony Condition. [Source: www.melbourne.vic.gov.au/Environment/CH2/]

Conclusion:

The design process of the Agrivaal Building will take into consideration the different modes in which the overall building can function, thus reacting to seasonal and daily changes in the environment. This will allow for higher occupant comfort levels within the building. It is clear that the CH2 Building tries to mimic systems of nature, resulting in energy efficiency, self-sufficiency and comfort. The Agrivaal Building will consider all the above systems and interpret them according to the climate of the City of Tshwane and the needs of the building itself.



fig 67



fig 68

Harmonia Office Building
São Paulo, Brazil
Tryptique
2010

Focus: passive design_

Introduction

The project in Harmonia Street is located in a neighborhood on the west side of São Paulo. It is an office building with planted facades irrigated by a mist system that uses recycled water from the roof garden. The building demonstrates sensitivity towards systems in nature, mimicking them in architecture.

Brief

- a building that demonstrates systems that work with nature
- energy efficient
- recycling of water

Like a Living Body

Compared to a living body, the building breathes, sweats and modifies itself (Harmonica 57 by Triptyque, 2008). The walls are thick and covered externally by a green layer that works like the skin of the structure. This dense wall is made of an organic concrete that has pores, where several plant species grow, giving the facades a unique look (Harmonica 57 by Triptyque, 2008).

Rain and soil waters are drained, treated and reused, a complex ecosystem is formed in its surroundings. The pipelines that serve the whole building – as well as the pumps and the water treatment system – are showing in the exterior walls, embracing them like veins and arteries of a body (Harmonica 57 by Triptyque, 2008).

Conclusion

The recycled water system will be adapted to suite The Agrivaal Building.

Fig.284:and
Fig.285: Harmonia 57 Office Building



Fig.288:Pipes that form part of the water recycling system in Harmonia 57 [Source: <http://www.architonic.com/aisht/harmonia-57-triptyque-architecture/5100477>]



Fig.289:Accessible roof [Source: <http://www.architonic.com/aisht/harmonia-57-triptyque-architecture/5100477>]



Fig.290:3D renderings envisioned by architects [Source: <http://www.architonic.com/aisht/harmonia-57-triptyque-architecture/5100477>]

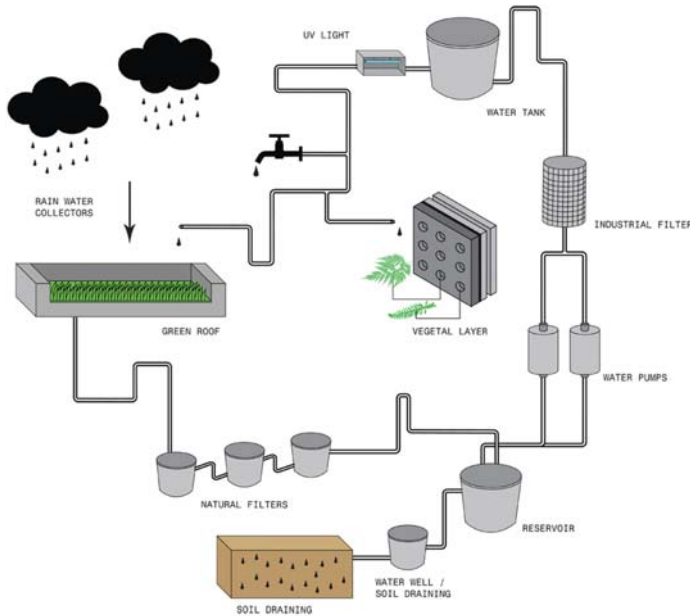


Fig.286:Water recycling system of Harmonia 57. [Source: <http://www.architonic.com/aisht/harmonia-57-triptyque-architecture/5100477>]

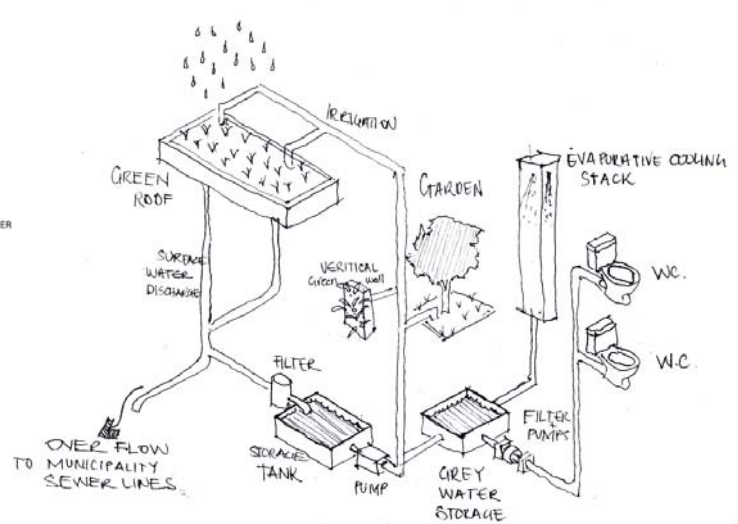


Fig.287:Proposed recycle sytem for the Agrivaal Building, using the Harmonica and Central Saint Giles building. [Source: <http://www.architonic.com/aisht/harmonia-57-triptyque-architecture/5100477>, edited by author 2011]



Fig.291:VIP drop off point [Source: www.bdp.com/Projects/By-Name/P-Z/Umoja-House/]

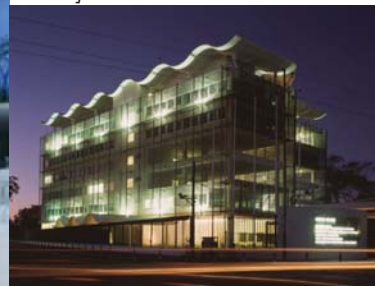


Fig.292:night view [Source: www.bdp.com/Projects/By-Name/P-Z/Umoja-House/]

Fig.293:Main entrance of Umoja House

Umoja House

Dar es Salaam, Tanzania
Manser Practice, London
2002

focus: embassy building_security_entrance points_louver system_African city

Introduction

The Umoja House accommodates the British High Commission and embassies of Germany and The Netherlands. It also houses the European Commission in Tanzania (BDP, 2011). The Manser Practice won the design competition. The 4,000m² building was designed for a high level of security and employs passive environmental controls to maintain comfortable naturally ventilated interior spaces.

Brief

- to create a secure building
- to build to European standards in a developing country
- to respond to an extremely aggressive climate
- to provide the client with comfortable internal conditions

A fitting response to the city and its climate

Protection against the climate pervaded all aspects of the design. To prevent overall heat gain the design has a floating solar roof and external louvers to three elevations.

Materials were sourced locally wherever possible, and supported supplied? via local agents and contractors (BDP, 2011). Metal mesh screens articulate three of the facades of the building. In all cases the mesh systems act as solar screens, maintaining protection from the sun. The screen mesh also acts as a protective skin, allowing for effective ventilation.

There are two major entrances to the compound, i.e. public and staff entrances. Each entrance is highly supervised and controlled by guards and CCTV as well as metal detectors.

Conclusion

Security is an important factor while designing for the proposed intervention of the Agrivaal Building. Check points and minimal access points to the building must be adhered to as clients are of high importance as political issues may cause life threatening situations.

Climate control is an important feature that the new intervention will explore. The Façade and boundary fence work in unison at the Umoja House. The two elements are visually permeable, but provide security and solar shading.



back entrance

boundary

main entrance

Fig.295: Access points at the Umoja House [Source: www.bdp.com/Projects/By-Name/P-Z/Umoja-House/]

Security is a high priority at the Umoja House. There are two entrance/exits into the complex. The main entrance receives visitors into the building. The second entrance is for people who work in the building, as well as accommodating for services.

Both access points to the site are monitored by CCTV, and have guards monitoring movement in and out of the building. The main entrance has a pedestrian check point, where a person entering is searched and clears the security check. They are directed to the main reception, who notifies the requested embassy. The visitor is either ushered or directed to the required floor and meets a second security check allowing them into the offices of the desired embassy.

A car entering the compound through the main entrance is usually VIP visitors. Depending on the guest, different security checks and protocols are executed.

The back entrance usually accepts service vehicles and people working in the offices in the building. High security checks are performed before entering.



→ CONCRETE ROOF ALLOWING FUNCTIONS ON ROOF TOP. - SHADED FOR HOT SUN

→ STEEL LOUVRED SCREENS.
- SOLAR CONTROL
- SECURITY
- FACADE LANGUAGE - UNITY OF FACADE
- ALLOWS FOR OPENABLE WINDOWS FOR FRESH AIR WITH STILL BEING SECURE.

→ WAVE TYPE STRUCTURE ALLOWS FOR AIR MOVEMENT WHILE PROVIDING SHADE AND PROTECTION FROM RAIN AND WIND.

→ BOUNDARY FENCE - SIMILAR LANGUAGE TO STEEL LOUNGERS ON FACADE. VISUALLY PERMEABLE - SEEMING ACCESSIBLE AND OPEN (NOT HIDING - OPEN TO PUBLIC)

Fig.294: louvers, fencing, roof. [Source: www.bdp.com/Projects/By-Name/P-Z/Umoja-House/]



Fig.296: Turbine Hall [Sourced: www.conference-venues.co.za/gjhb_forumturbine.htm]

Introduction

focus: heritage_

The original Turbine Hall is considered one of the finest examples of industrial architecture in Johannesburg, occupies a land mark site in Newtown, situated at the “gateway to Newtown” on Miriam Makeba (formerly Bezuidenhout) and Jeppe Streets (Turbine Hall, 2004). It is a listed heritage site, but over the years had fallen into serious decay. Its development has been an important symbol of the progressive realisation of the Newtown revitalisation vision.

For many years the neglected building was home to a large number of squatters who were subsequently relocated in 2000. The occupation of the building by squatters has resulted in some structural damage to the building, which stood until April 2002, when minor repairs (the replacement of the roof and cleaning of the boiler room) were undertaken to enable the facility to be utilised for major events in Newtown (Turbine Hall, 2004).

Brief

- rehabilitation of the building
- to be part of the reverse the decline of western sector of Johannesburg (Turbine Hall, 2004).

Design

The design concept was to provide offices and needed space while preserving the spirit of the existing Turbine Hall. This was achieved by demolition of one structure to create a underground parking. New buildings relate to the existing complex in a way that makes them spatially and functionally interdependent (Krige & Beswick, 2001:99). New work has been painted, while existing structure is left in its original state.

Demolition

The Heritage Impact Assessment (HIA) concurs with the proposed demolition of one of the three buildings on site put forth by AngloGold Ashanti. The space allowed for underground parking that is hidden and not a structure that would overpower the existing Turbine Hall, which is the tallest building on the compound (Krige & Beswick, 2001:90).

Burra Charter

The principles of the Burra Charter provided guidance on the conservation of cultural significance in the Turbine Hall. The charter discourages demolition of culturally significant fabric of place, however in this case it is



fig 75



fig 76



fig 77

Fig.297:g Gass box inside concrete shell [Source: author]

Fig.298:New ballustrade connected to existing column. [Source: author]

Fig.299:Plaque: information of the heritage of the building. [Source: author]



Fig.300:Existing steel bunker. [Source: author]



Fig.301:New glass partitioning with aluminium frames. [Source: author]

appropriate as it allows for conservation of the complex (Krige & Beswick, 2001:91).

Conclusion

The new work in the Turbine Hall is clearly distinguished. The memory of the old building has been retained and enhanced by the use of steel structures lightly hovering over the existing concrete beams. The use of the Burra Charter enable well informed decisions allowing for functional spaces and conservation of existing structures.



New York Times

New York, USA
Renzo Piano Building Workshop and Fox & Fowle Architects
2005

Among the most prominent of the building's "green" features is the unique open-air garden, the first of its kind in Manhattan. The garden, which is surrounded by glass, features a grove of 16 m paper birch trees, a ground covering of autumn fern, and an elegant wooden footbridge. Visible from the lobby, the building's offices and the street, the garden is a calm and serene environment, a 'green' oasis in the middle of one of the busiest, most densely packed neighborhoods in New York (Fox and Fowle Architects, 2002).

Double-Skin Curtain Wall

To reduce the amount of heat coming into the building, architect Renzo Piano envisioned a second skin of horizontal ceramic rods that act as a sunshade, sufficient in number to block half of the sun's energy (Fox and Fowle Architects, 2002). This is the first time this type of double-skinned curtain wall has ever been used. By deflecting the heat, the double curtain wall allows use of floor-to-ceiling ultra-clear glass that maximizes views and light for occupants of the building while allowing people outside the building to see movement within (Fox and Fowle Architects, 2002). The ceramic rods also enhance the design by gently reflecting light and color changes throughout the day (Fox and Fowle Architects, 2002).

focus: double skin_security_shading structure_signage

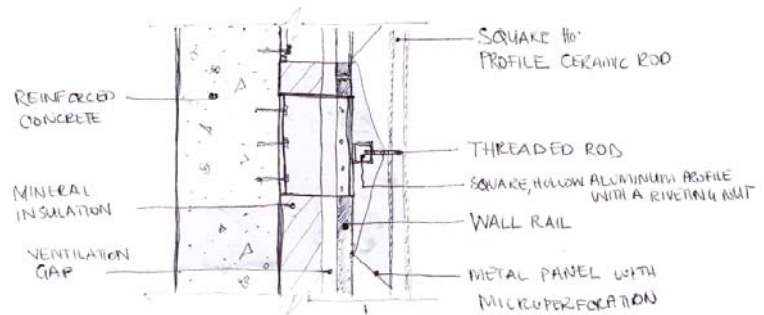


Fig.302: Detail of ceramic solar shading structure. [Source: <http://www.architectmagazine.com/exterior/brandhorst-museum.aspx>]

position of second skin

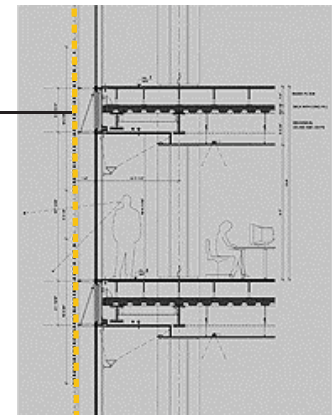


Fig.303: Section showing position of shading system [Source: <http://www.arcspac.com/architects/pianoNYT/>]



Fig.304: Entrance of the New York Times Building [Source: www.arcspace.com/architects/piano/nytt/]

Fig.305:Lobby Entrance [Source: www.newyorktimesbuilding.com/ Photograph by Kenzo Hsieh (HSUEH-HSIEN HSIIEH), 2007.]



Fig.306:Lobby Entrance [Source: www.newyorktimesbuilding.com/ Photograph by Kenzo Hsieh (HSUEH-HSIEN HSIIEH), 2007.]

Fig.307: and Fig.308: [Source: www.arcspace.com/architects/piano/nytt/]